TEST REPORT

Reference No......	:	WTN19S09066646W001
FCC ID.....	:	2AUPR-XJ-W1A
Applicant	:	Ningbo xiaojiang Internet of Things Technology Co.,Ltd
Address	:	Romm 2302-2303, Jiayin Building, No.455, keji Road,Yinzhou District, Ningbo, China
Manufacturer	:	Ningbo xiaojiang Internet of Things Technology Co.,Ltd
Address	:	Romm 2302-2303, Jiayin Building, No.455, keji Road,Yinzhou District, Ningbo, China
Product	:	XJ-W1A
Model(s).	:	XJ-W1A
Standards	:	FCC CFR47 Part 15 C Section 15.247: 2019
Date of Receipt sample	:	2019-09-25
Date of Test	:	2019-09-26 to 2019-10-14
Date of Issue	:	2019-10-24
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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2. Revision History

Test report #	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTN19S09066644W001	2019-09-25	2019-09-26 to 2019-10-14	2019-10-24	original	-	Valid

2 General Information

2.1 General Description of E.U.T

Product:	XJ-W1A
Model(s).:	XJ-W1A
Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40: 2422MHz~2452MHz
Antenna installation:	PCB Printed Antenna
Antenna Gain:	2.0dBi
Type of modulation:	IEEE 802.11b (CCK/QPSK/BPSK,11Mbps max.) IEEE 802.11g (BPSK/QPSK/16QAM/64QAM,54Mbps max.) IEEE 802.11n (BPSK/QPSK/16QAM/64QAM,HT20:72Mbps max., HT40:150Mbps max.)

2.2 Details of E.U.T

Ratings	DC 3.0V to 3.6V

2.3 Channel List

WIFI

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	2	2417	3	2422	4	2427
5	2432	6	2437	7	2442	8	2447
9	2452	10	2457	11	2462	12	-

2.4 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Conducted Spurious Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Band Edge	802.11b	11 Mbps	1/11	TX
	802.11g	54 Mbps	1/11	TX
	802.11n HT20	108 Mbps	1/11	TX
	802.11n HT40	150 Mbps	3/9	TX
Power Spectral Density	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Frequency Range	802.11b	11 Mbps	1/11	TX
	802.11g	54 Mbps	1/11	TX
	802.11n HT20	108 Mbps	1/11	TX
	802.11n HT40	150 Mbps	3/9	TX
Transmitter Spurious Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX

Note :Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product.

3 Equipment Used during Test

3.1 Equipments List

Conducted Emissions Test Site						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMI Test Receiver	R&S	ESCI	101155	2019-09-15	2020-09-14
2	LISN	SCHWARZBECK	NSLK 8128	8128-259	2019-09-15	2020-09-14
3	Limiter	CYBERTEK	EM5010	261115-001-0024	2019-09-15	2020-09-14
4	Cable	Laplace	RF300	-	2019-07-18	2020-07-17
3m Semi-anechoic Chamber for Radiation Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP30	100091	2019-04-19	2020-04-18
2	Amplifier	Agilent	8447D	2944A10178	2019-04-19	2020-04-18
4	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2019-04-28	2020-04-27
5	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2018-10-15	2019-10-14
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2019-04-19	2020-04-18
7	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2018-10-25	2019-10-24
8	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2019-04-19	2020-04-18
9	Coaxial Cable (above 1GHz)	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2019-04-19	2020-04-18
10	Broad-band Horn Antenna	SCHWARZBECK	BBV 9721	100472	2018-10-25	2019-10-24
11	Spectrum Analyzer	R&S	FSP40	100501	2018-11-13	2019-11-12
12	Coaxial Cable	ZT40-2.92J-2.92J-2.0M	10MHz-40GHz	17100919	2018-10-15	2019-10-14
1	Spectrum Analyzer	R&S	FSP30	100091	2019-04-19	2020-04-18
3m Semi-anechoic Chamber for Radiation Emissions						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	2019-04-20	2020-04-19
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2019-05-24	2020-05-23
3	Active Loop Antenna	Com-Power Corp.	AL-130R	10160007	2019-04-28	2020-04-27
4	Amplifier	ANRITSU	MH648A	M43381	2019-04-19	2020-04-18
5	Cable	HUBER+SUHNER	CBL2	525178	2019-04-20	2020-04-19
RF Conducted Testing						

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	R&S	FSP30	100091	2019-04-19	2020-04-18
2.	Coaxial Cable	Top	10Hz-30GHz	-	2019-09-12	2020-09-11
3	Antenna Connector*	Realacc	45RSm	-	2019-09-12	2020-09-11
4	DC Block	Gwave	GDCB-3G-N-SMA	140307001	2019-09-12	2020-09-11
"*": The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.						

3.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

3.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave,Tianhe District, Guangzhou, Guang dong, China.

4 Test Summary

Test Items	Test Requirement	Result
Spurious Radiated Emissions	15.247 15.205(a) 15.209(a)	C
Conducted Emissions	15.207(a)	C
Conducted Spurious Emissions	15.247	C
Bandwidth	15.247(a)(2)	C
Maximum Peak Output Power	15.247(b)(3),(4)	C
Power Spectral Density	15.247(e)	C
Band Edge	15.247(d)	C
Antenna Requirement	15.203	C
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

5 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

5.1 E.U.T. Operation

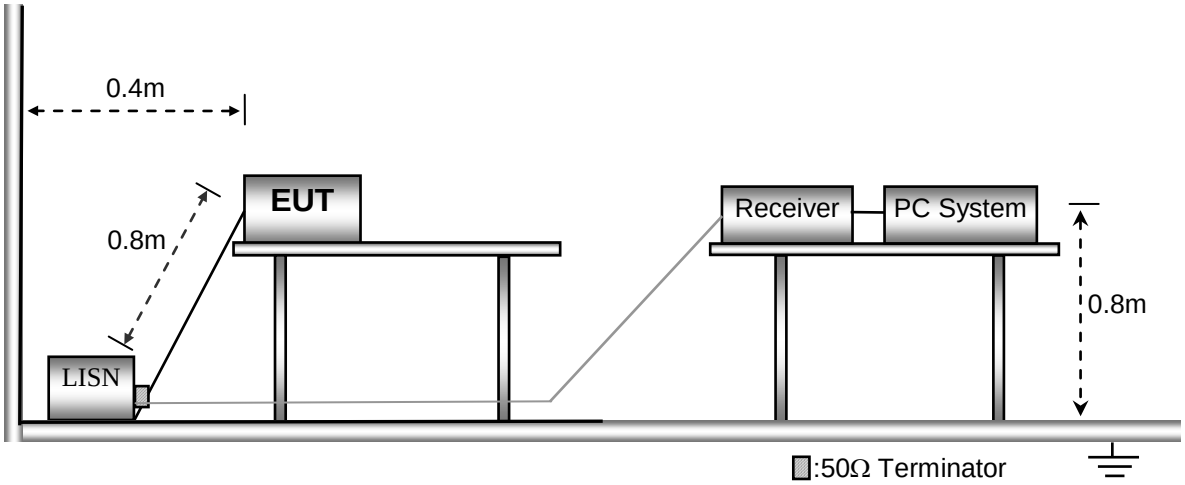
Operating Environment **:**

Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa
EUT Operation:	Transmitting mode

The test was performed in Transmitting mode, Only the worst case 802.11b mode were record in the report.

5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10.



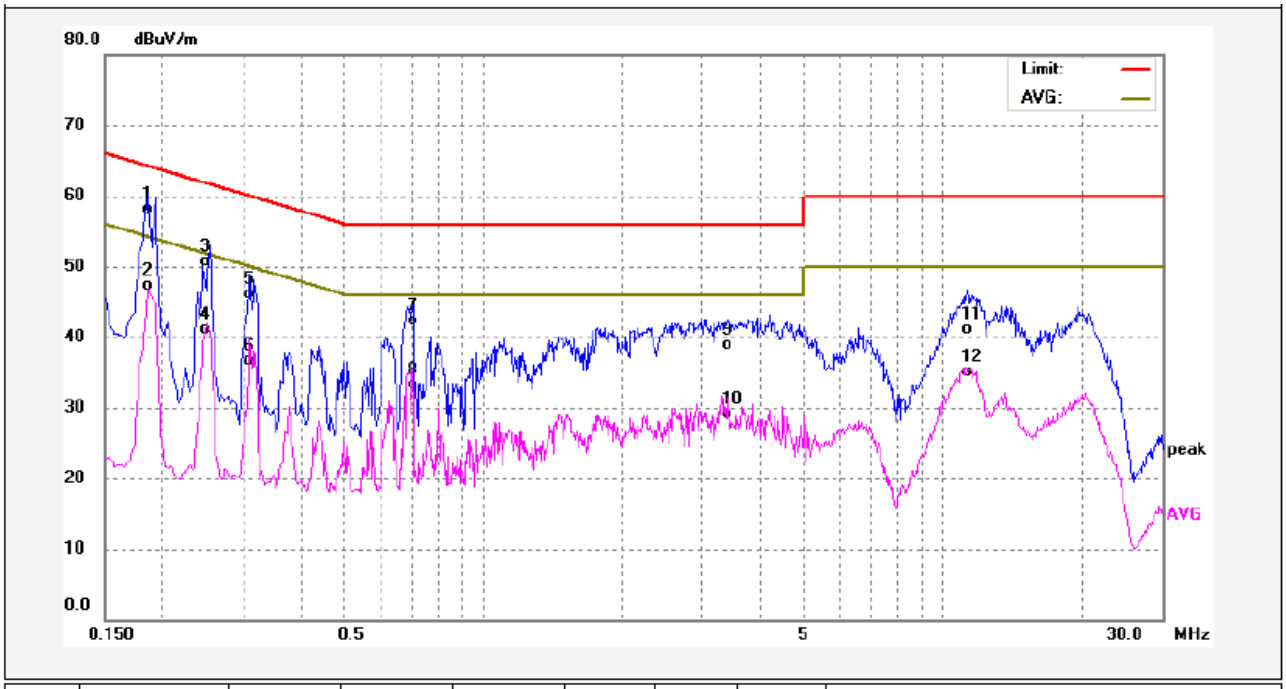
5.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.4 Conducted Emission Test Result

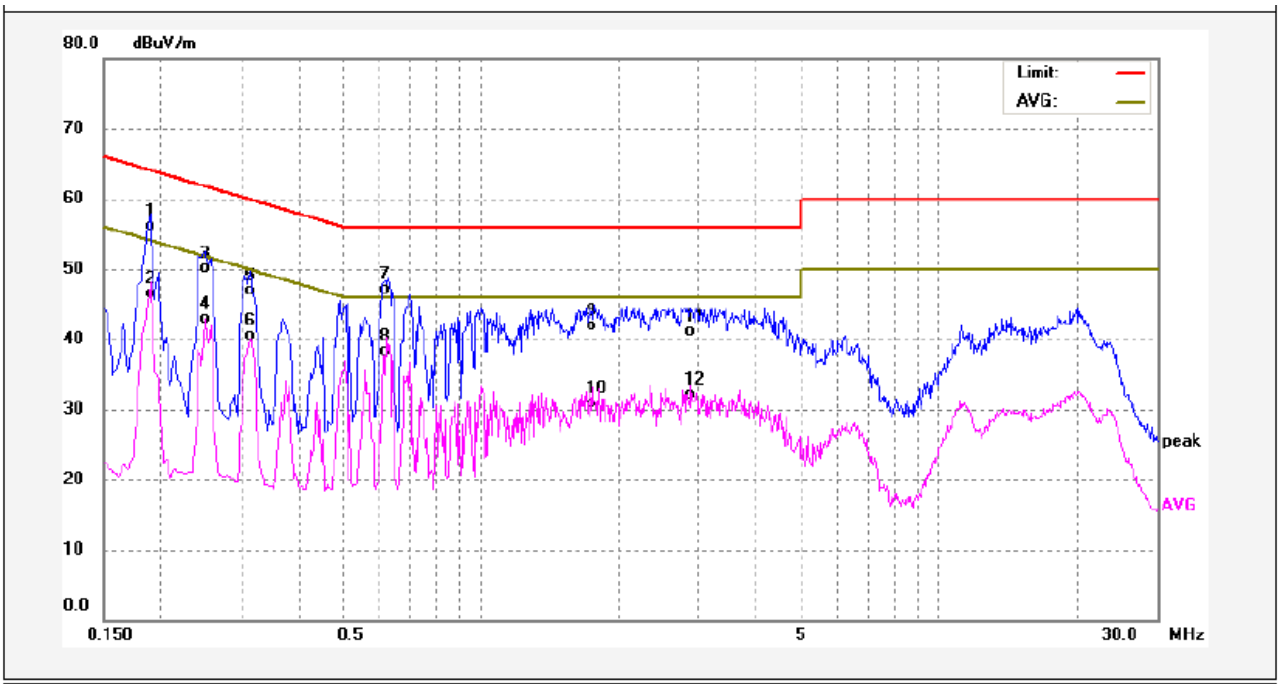
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	0.1860	47.89	10.31	58.20	64.21	-6.01	QP	
2	0.1860	37.07	10.31	47.38	54.21	-6.83	AVG	
3	0.2500	40.30	10.39	50.69	61.75	-11.06	QP	
4	0.2500	30.67	10.39	41.06	51.75	-10.69	AVG	
5	0.3100	35.72	10.41	46.13	59.97	-13.84	QP	
6	0.3100	26.37	10.41	36.78	49.97	-13.19	AVG	
7	0.7019	31.80	10.44	42.24	56.00	-13.76	QP	
8	0.7019	22.85	10.44	33.29	46.00	-12.71	AVG	
9	3.4020	28.09	10.73	38.82	56.00	-17.18	QP	
10	3.4020	18.37	10.73	29.10	46.00	-16.90	AVG	
11	11.3100	30.04	11.14	41.18	60.00	-18.82	QP	
12	11.3100	23.87	11.14	35.01	50.00	-14.99	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit dBuV/	Margin (dB)	Detector	Remark
1	0.1900	45.71	10.31	56.02	64.03	-8.01	QP	
2	0.1900	36.15	10.31	46.46	54.03	-7.57	AVG	
3	0.2500	39.71	10.39	50.10	61.75	-11.65	QP	
4	0.2500	32.52	10.39	42.91	51.75	-8.84	AVG	
5	0.3140	36.57	10.41	46.98	59.86	-12.88	QP	
6	0.3140	30.19	10.41	40.60	49.86	-9.26	AVG	
7	0.6220	36.56	10.48	47.04	56.00	-8.96	QP	
8	0.6220	27.92	10.48	38.40	46.00	-7.60	AVG	
9	1.7740	31.33	10.52	41.85	56.00	-14.15	QP	
10	1.7740	20.45	10.52	30.97	46.00	-15.03	AVG	
11	2.8620	30.47	10.68	41.15	56.00	-14.85	QP	
12	2.8620	21.35	10.68	32.03	46.00	-13.97	AVG	

6 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

6.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

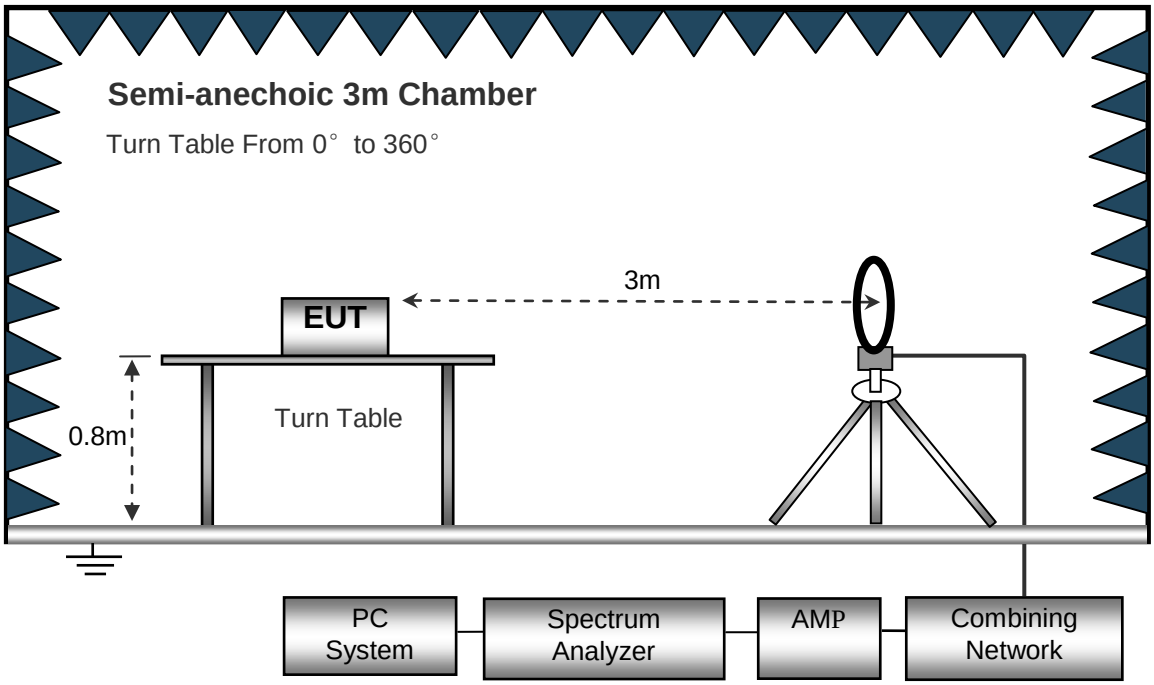
EUT Operation: Transmitting mode

The test was performed in transmitting mode, the test data were shown in the report.

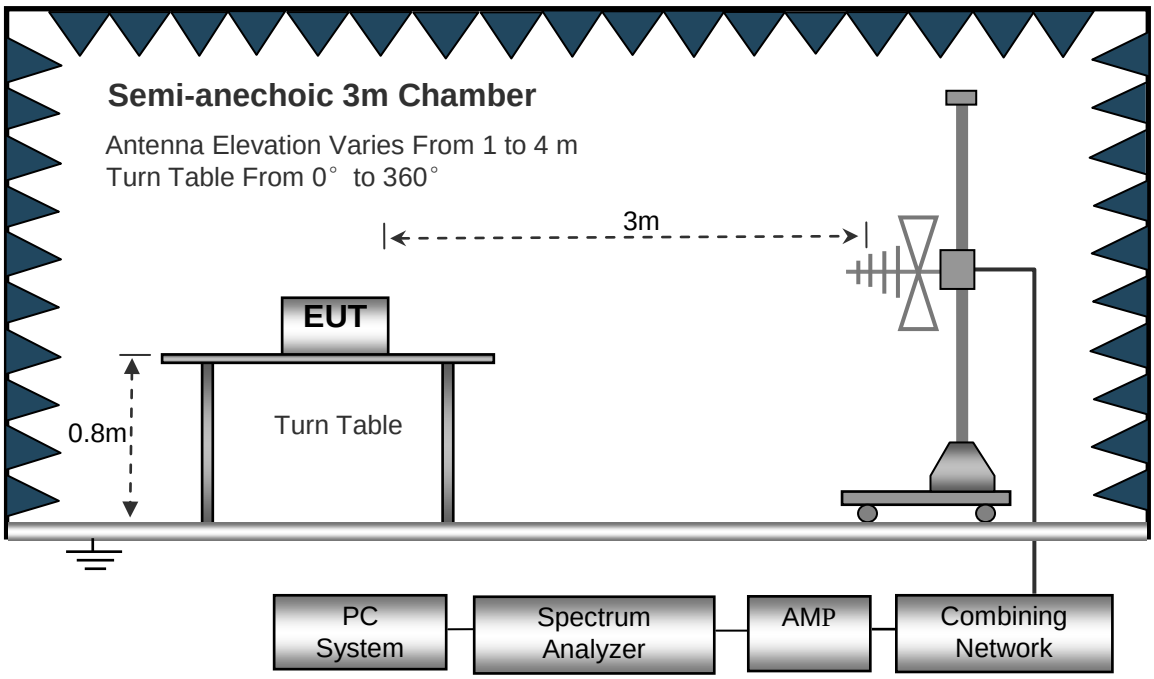
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

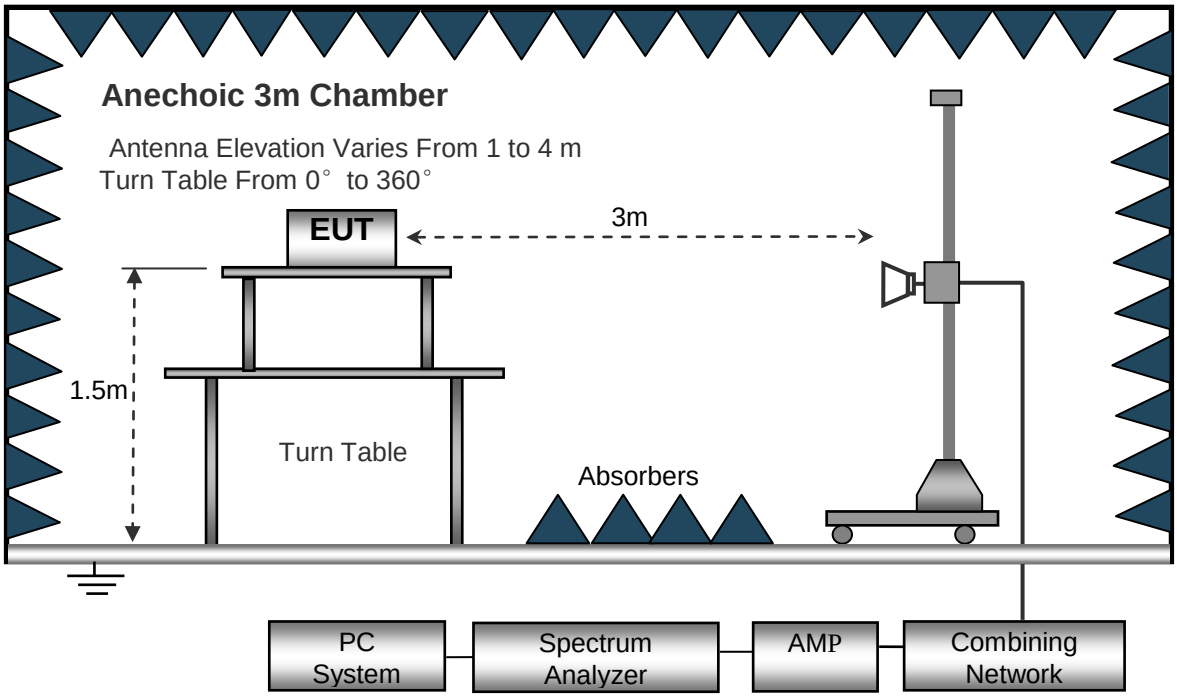
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



6.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed .....Auto
IF Bandwidth 10kHz
Video Bandwidth 10kHz
Resolution Bandwidth 10kHz

30MHz ~ 1GHz

Sweep Speed .....Auto
Detector .....PK
Resolution Bandwidth 100kHz
Video Bandwidth 300kHz

Above 1GHz

Sweep Speed .....Auto
Detector .....PK
Resolution Bandwidth 1MHz
Video Bandwidth 3MHz
Detector .....Ave.
Resolution Bandwidth 1MHz
Video Bandwidth 10Hz

6.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane; For above1GHz, the EUT is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

6.6 Summary of Test Results

Test Frequency: 9kHz ~ 30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11b: Low Channel 2412MHz									
191.75	59.28	QP	323	1.3	H	-18.78	40.50	43.50	-3.00
191.75	46.51	QP	26	1.3	V	-18.78	27.73	43.50	-15.77
4824.00	55.30	PK	200	1.3	V	-1.06	54.24	74.00	-19.76
4824.00	40.50	Ave	200	1.3	V	-1.06	39.44	54.00	-14.56
7236.00	47.59	PK	86	1.5	H	1.33	48.92	74.00	-25.08
7236.00	39.65	Ave	86	1.5	H	1.33	40.98	54.00	-13.02
2329.95	46.84	PK	268	1.1	V	-13.19	33.65	74.00	-40.35
2329.95	39.84	Ave	268	1.1	V	-13.19	26.65	54.00	-27.35
2389.71	42.98	PK	74	1.3	H	-13.14	29.84	74.00	-44.16
2389.71	36.74	Ave	74	1.3	H	-13.14	23.60	54.00	-30.40
2498.43	43.25	PK	277	1.7	V	-13.08	30.17	74.00	-43.83
2498.43	36.65	Ave	277	1.7	V	-13.08	23.57	54.00	-30.43

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11b: Middle Channel 2437MHz									
191.75	57.81	QP	346	1.9	H	-18.78	39.03	43.50	-4.47
191.75	45.35	QP	254	1.8	V	-18.78	26.57	43.50	-16.93
4874.00	56.24	PK	144	1.0	V	-0.62	55.62	74.00	-18.38
4874.00	41.46	Ave	144	1.0	V	-0.62	40.84	54.00	-13.16
7311.00	48.11	PK	236	1.3	H	2.21	50.32	74.00	-23.68
7311.00	40.76	Ave	236	1.3	H	2.21	42.97	54.00	-11.03
2320.56	45.95	PK	197	2.0	V	-13.19	32.76	74.00	-41.24
2320.56	37.74	Ave	197	2.0	V	-13.19	24.55	54.00	-29.45
2352.17	44.64	PK	357	1.6	H	-13.14	31.50	74.00	-42.50
2352.17	36.47	Ave	357	1.6	H	-13.14	23.33	54.00	-30.67
2494.73	44.33	PK	98	1.7	V	-13.08	31.25	74.00	-42.75
2494.73	36.96	Ave	98	1.7	V	-13.08	23.88	54.00	-30.12

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11b: High Channel 2462MHz									
191.75	59.10	QP	1	1.2	H	-18.78	40.32	43.50	-3.18
191.75	48.06	QP	75	1.1	V	-18.78	29.28	43.50	-14.22
4924.00	54.80	PK	79	1.6	V	-0.24	54.56	74.00	-19.44
4924.00	40.30	Ave	79	1.6	V	-0.24	40.06	54.00	-13.94
7386.00	48.21	PK	6	1.3	H	2.84	51.05	74.00	-22.95
7386.00	38.77	Ave	6	1.3	H	2.84	41.61	54.00	-12.39
2327.43	45.94	PK	33	1.8	V	-13.19	32.75	74.00	-41.25
2327.43	39.43	Ave	33	1.8	V	-13.19	26.24	54.00	-27.76
2363.16	43.56	PK	163	1.8	H	-13.14	30.42	74.00	-43.58
2363.16	37.38	Ave	163	1.8	H	-13.14	24.24	54.00	-29.76
2496.54	43.15	PK	39	1.2	V	-13.08	30.07	74.00	-43.93
2496.54	38.76	Ave	39	1.2	V	-13.08	25.68	54.00	-28.32

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11g: Low Channel 2412MHz									
191.75	59.18	QP	201	1.7	H	-18.78	40.40	43.50	-3.10
191.75	45.31	QP	268	1.9	V	-18.78	26.53	43.50	-16.97
4824.00	53.27	PK	251	1.6	V	-1.06	52.21	74.00	-21.79
4824.00	41.98	Ave	251	1.6	V	-1.06	40.92	54.00	-13.08
7236.00	47.60	PK	246	1.2	H	1.33	48.93	74.00	-25.07
7236.00	38.63	Ave	246	1.2	H	1.33	39.96	54.00	-14.04
2347.91	45.58	PK	280	1.8	V	-13.19	32.39	74.00	-41.61
2347.91	37.57	Ave	280	1.8	V	-13.19	24.38	54.00	-29.62
2370.63	42.63	PK	90	1.9	H	-13.14	29.49	74.00	-44.51
2370.63	36.10	Ave	90	1.9	H	-13.14	22.96	54.00	-31.04
2486.52	42.33	PK	355	1.3	V	-13.08	29.25	74.00	-44.75
2486.52	38.00	Ave	355	1.3	V	-13.08	24.92	54.00	-29.08

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11g: Middle Channel 2437MHz									
191.75	58.51	QP	193	2.0	H	-18.78	39.73	43.50	-3.77
191.75	44.67	QP	38	1.5	V	-18.78	25.89	43.50	-17.61
4874.00	57.40	PK	92	1.7	V	-0.62	56.78	74.00	-17.22
4874.00	39.44	Ave	92	1.7	V	-0.62	38.82	54.00	-15.18
7311.00	46.95	PK	54	1.1	H	2.21	49.16	74.00	-24.84
7311.00	38.33	Ave	54	1.1	H	2.21	40.54	54.00	-13.46
2321.91	45.84	PK	99	1.9	V	-13.19	32.65	74.00	-41.35
2321.91	38.33	Ave	99	1.9	V	-13.19	25.14	54.00	-28.86
2387.96	43.62	PK	271	1.5	H	-13.14	30.48	74.00	-43.52
2387.96	37.90	Ave	271	1.5	H	-13.14	24.76	54.00	-29.24
2491.72	43.16	PK	153	1.0	V	-13.08	30.08	74.00	-43.92
2491.72	37.60	Ave	153	1.0	V	-13.08	24.52	54.00	-29.48

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11g: High Channel 2462MHz									
191.75	58.68	QP	209	1.9	H	-18.78	39.90	43.50	-3.60
191.75	46.47	QP	335	1.3	V	-18.78	27.69	43.50	-15.81
4924.00	54.56	PK	156	2.0	V	-0.24	54.32	74.00	-19.68
4924.00	42.25	Ave	156	2.0	V	-0.24	42.01	54.00	-11.99
7386.00	46.28	PK	36	1.7	H	2.84	49.12	74.00	-24.88
7386.00	39.07	Ave	36	1.7	H	2.84	41.91	54.00	-12.09
2347.42	45.28	PK	37	1.6	V	-13.19	32.09	74.00	-41.91
2347.42	38.20	Ave	37	1.6	V	-13.19	25.01	54.00	-28.99
2387.29	44.82	PK	240	1.5	H	-13.14	31.68	74.00	-42.32
2387.29	38.89	Ave	240	1.5	H	-13.14	25.75	54.00	-28.25
2484.77	44.11	PK	76	1.4	V	-13.08	31.03	74.00	-42.97
2484.77	36.98	Ave	76	1.4	V	-13.08	23.90	54.00	-30.10

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT20: Low Channel 2412MHz									
191.75	58.17	QP	246	1.0	H	-18.78	39.39	43.50	-4.11
191.75	47.55	QP	165	1.5	V	-18.78	28.77	43.50	-14.73
4824.00	54.81	PK	170	1.7	V	-1.06	53.75	74.00	-20.25
4824.00	38.69	Ave	170	1.7	V	-1.06	37.63	54.00	-16.37
7236.00	47.38	PK	353	1.4	H	1.33	48.71	74.00	-25.29
7236.00	39.90	Ave	353	1.4	H	1.33	41.23	54.00	-12.77
2343.52	46.28	PK	74	1.6	V	-13.19	33.09	74.00	-40.91
2343.52	37.58	Ave	74	1.6	V	-13.19	24.39	54.00	-29.61
2357.34	43.15	PK	289	1.6	H	-13.14	30.01	74.00	-43.99
2357.34	37.79	Ave	289	1.6	H	-13.14	24.65	54.00	-29.35
2493.32	42.27	PK	24	1.9	V	-13.08	29.19	74.00	-44.81
2493.32	37.93	Ave	24	1.9	V	-13.08	24.85	54.00	-29.15

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT20: Middle Channel 2437MHz									
191.75	56.54	QP	343	1.4	H	-18.78	37.76	43.50	-5.74
191.75	46.99	QP	358	1.9	V	-18.78	28.21	43.50	-15.29
4874.00	52.00	PK	289	1.8	V	-0.62	51.38	74.00	-22.62
4874.00	43.47	Ave	289	1.8	V	-0.62	42.85	54.00	-11.15
7311.00	48.05	PK	292	1.7	H	2.21	50.26	74.00	-23.74
7311.00	42.77	Ave	292	1.7	H	2.21	44.98	54.00	-9.02
2329.73	46.49	PK	164	1.6	V	-13.19	33.30	74.00	-40.70
2329.73	37.05	Ave	164	1.6	V	-13.19	23.86	54.00	-30.14
2363.98	42.47	PK	117	1.2	H	-13.14	29.33	74.00	-44.67
2363.98	38.04	Ave	117	1.2	H	-13.14	24.90	54.00	-29.10
2489.89	42.93	PK	97	2.0	V	-13.08	29.85	74.00	-44.15
2489.89	37.02	Ave	97	2.0	V	-13.08	23.94	54.00	-30.06

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT20: High Channel 2462MHz									
191.75	58.06	QP	72	2.0	H	-18.78	39.28	43.50	-4.22
191.75	51.69	QP	82	1.2	V	-18.78	32.91	43.50	-10.59
4924.00	58.03	PK	175	1.4	V	-0.24	57.79	74.00	-16.21
4924.00	40.97	Ave	175	1.4	V	-0.24	40.73	54.00	-13.27
7386.00	46.05	PK	36	1.6	H	2.84	48.89	74.00	-25.11
7386.00	43.40	Ave	36	1.6	H	2.84	46.24	54.00	-7.76
2327.24	46.92	PK	131	1.6	V	-13.19	33.73	74.00	-40.27
2327.24	37.85	Ave	131	1.6	V	-13.19	24.66	54.00	-29.34
2359.56	43.15	PK	44	1.7	H	-13.14	30.01	74.00	-43.99
2359.56	36.27	Ave	44	1.7	H	-13.14	23.13	54.00	-30.87
2489.62	42.38	PK	202	2.0	V	-13.08	29.30	74.00	-44.70
2489.62	38.87	Ave	202	2.0	V	-13.08	25.79	54.00	-28.21

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT40: Low Channel 2422MHz									
191.75	55.97	QP	158	1.2	H	-18.78	37.19	43.50	-6.31
191.75	49.86	QP	305	1.7	V	-18.78	31.08	43.50	-12.42
4844.00	57.42	PK	251	1.9	V	-1.06	56.36	74.00	-17.64
4844.00	38.15	Ave	251	1.9	V	-1.06	37.09	54.00	-16.91
7266.00	44.67	PK	205	1.3	H	1.33	46.00	74.00	-28.00
7266.00	34.67	Ave	205	1.3	H	1.33	36.00	54.00	-18.00
2345.95	45.43	PK	45	2.0	V	-13.19	32.24	74.00	-41.76
2345.95	37.83	Ave	45	2.0	V	-13.19	24.64	54.00	-29.36
2359.44	44.67	PK	220	1.1	H	-13.14	31.53	74.00	-42.47
2359.44	38.40	Ave	220	1.1	H	-13.14	25.26	54.00	-28.74
2485.21	44.85	PK	328	2.0	V	-13.08	31.77	74.00	-42.23
2485.21	38.84	Ave	328	2.0	V	-13.08	25.76	54.00	-28.24

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT40: Middle Channel 2437MHz									
191.75	58.86	QP	180	1.8	H	-18.78	40.08	43.50	-3.42
191.75	43.40	QP	223	1.6	V	-18.78	24.62	43.50	-18.88
4874.00	51.30	PK	317	1.3	V	-0.62	50.68	74.00	-23.32
4874.00	41.24	Ave	317	1.3	V	-0.62	40.62	54.00	-13.38
7311.00	46.33	PK	225	1.9	H	2.21	48.54	74.00	-25.46
7311.00	38.89	Ave	225	1.9	H	2.21	41.10	54.00	-12.90
2346.32	46.68	PK	208	1.5	V	-13.19	33.49	74.00	-40.51
2346.32	39.52	Ave	208	1.5	V	-13.19	26.33	54.00	-27.67
2359.32	43.04	PK	86	1.5	H	-13.14	29.90	74.00	-44.10
2359.32	36.13	Ave	86	1.5	H	-13.14	22.99	54.00	-31.01
2499.47	44.18	PK	169	1.4	V	-13.08	31.10	74.00	-42.90
2499.47	38.88	Ave	169	1.4	V	-13.08	25.80	54.00	-28.20

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n HT40: High Channel 2452MHz									
191.75	55.54	QP	111	1.5	H	-18.78	36.76	43.50	-6.74
191.75	44.76	QP	211	2.0	V	-18.78	25.98	43.50	-17.52
4904.00	55.09	PK	56	1.3	V	-0.24	54.85	74.00	-19.15
4904.00	36.72	Ave	56	1.3	V	-0.24	36.48	54.00	-17.52
7356.00	43.41	PK	43	1.8	H	2.84	46.25	74.00	-27.75
7356.00	36.40	Ave	43	1.8	H	2.84	39.24	54.00	-14.76
2340.84	46.75	PK	305	1.9	V	-13.19	33.56	74.00	-40.44
2340.84	37.29	Ave	305	1.9	V	-13.19	24.10	54.00	-29.90
2385.65	44.07	PK	30	1.7	H	-13.14	30.93	74.00	-43.07
2385.65	36.80	Ave	30	1.7	H	-13.14	23.66	54.00	-30.34
2484.33	42.35	PK	212	1.8	V	-13.08	29.27	74.00	-44.73
2484.33	38.73	Ave	212	1.8	V	-13.08	25.65	54.00	-28.35

Test Frequency: 18GHz~25GHz

The measurements were more than 20 dB below the limit and not recorded.

7 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02

Test Result: PASS

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

7.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:

Blow 30MHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

Above 30MHz:

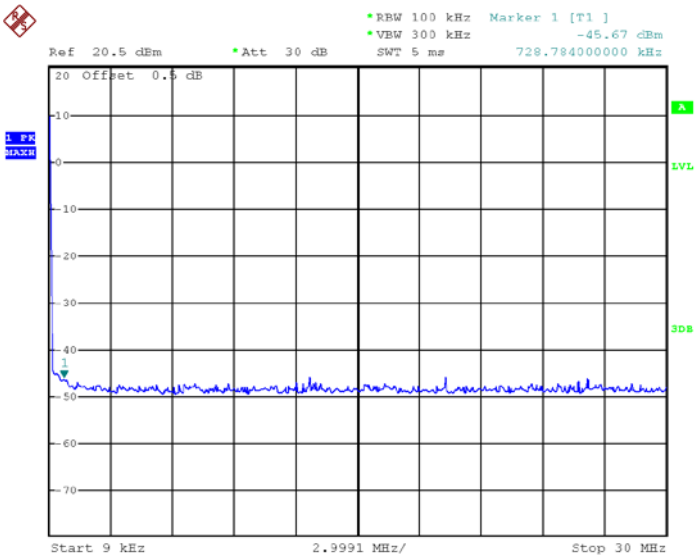
RBW = 1MHz, VBW = 3MHz, Sweep = auto

Detector function = peak, Trace = max hold

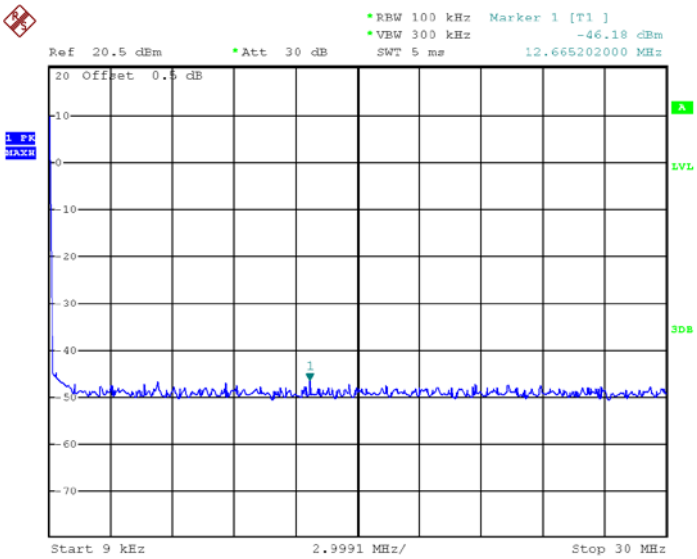
7.2 Test Result

802.11b

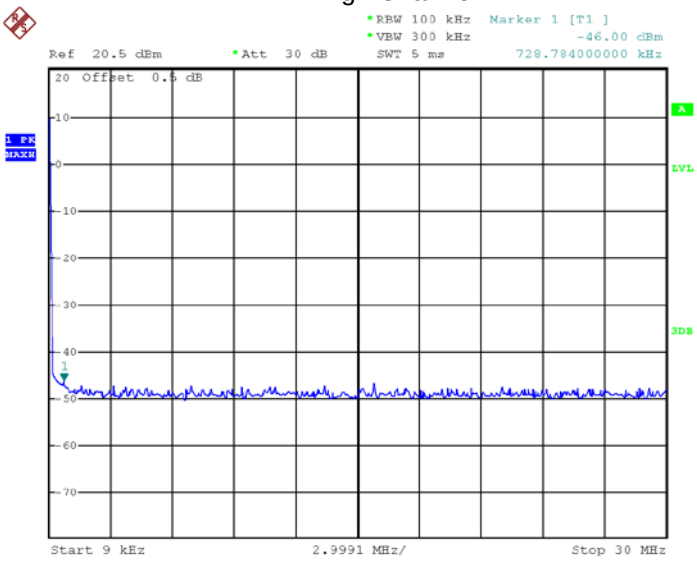
Low Channel



Middle Channel

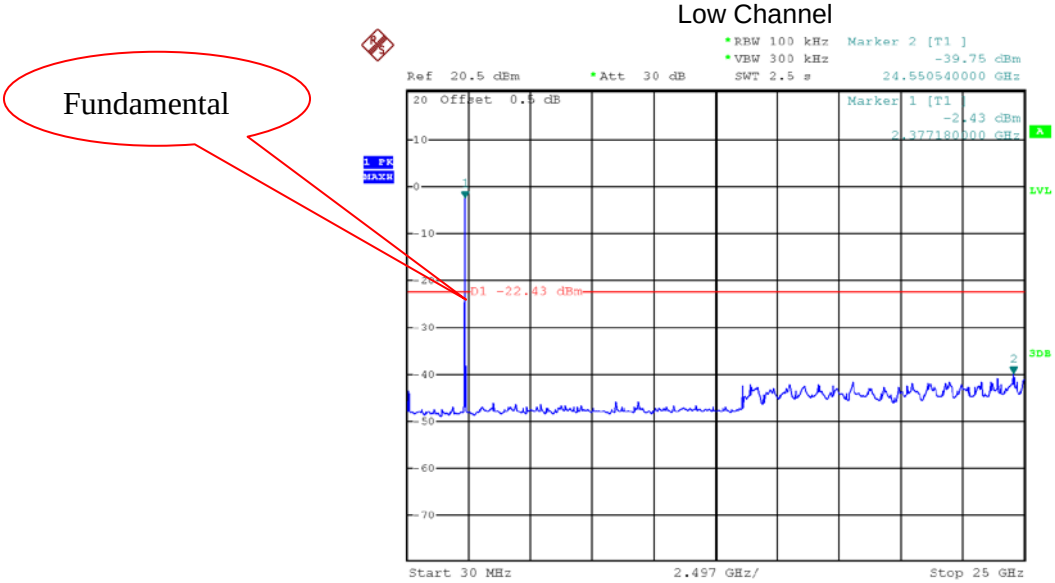


High Channel

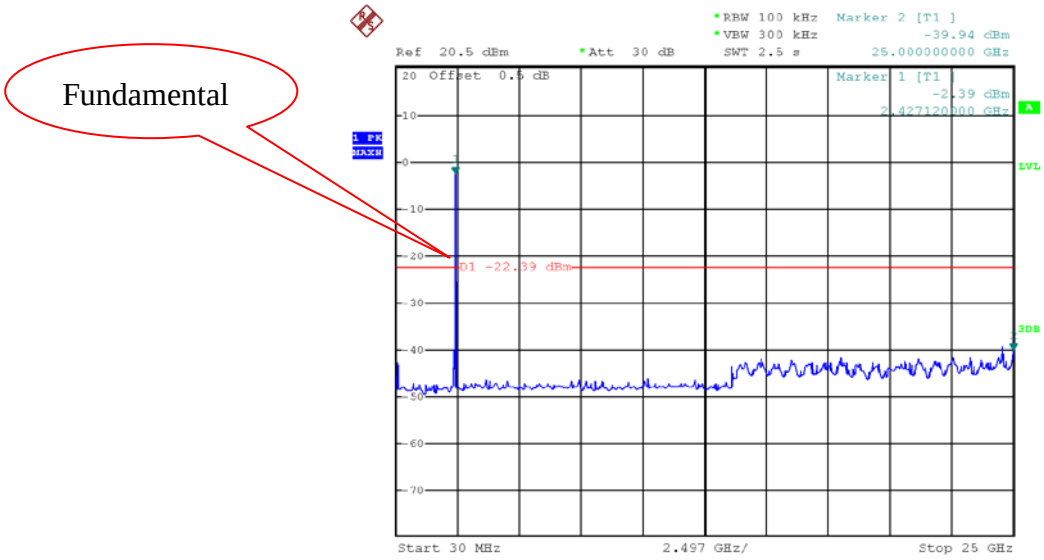


802.11b

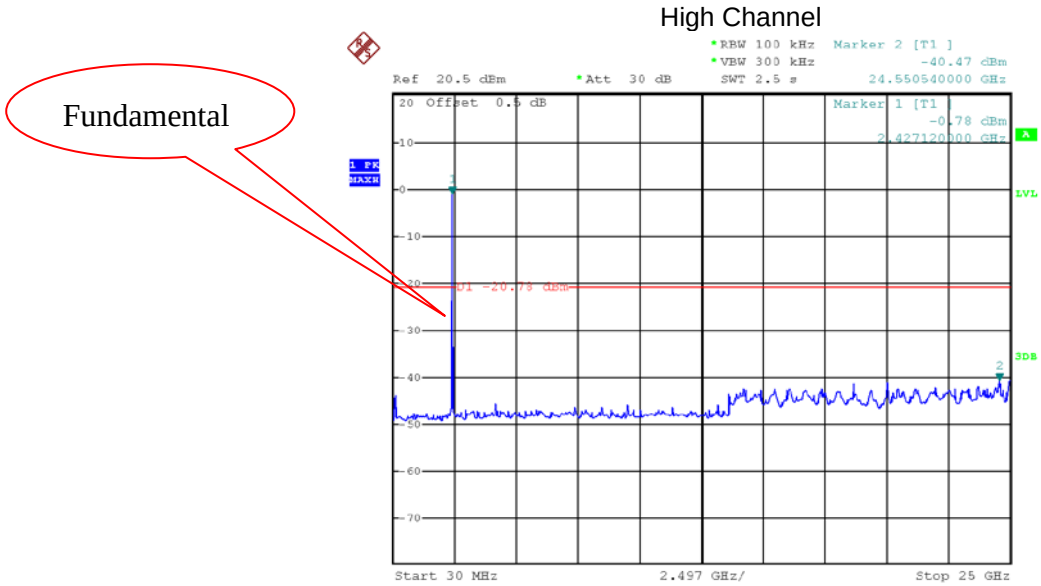
Low Channel



Middle Channel

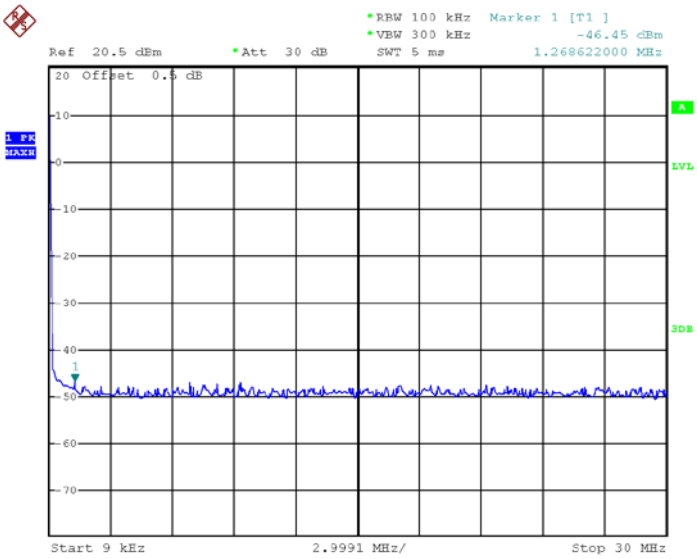


High Channel

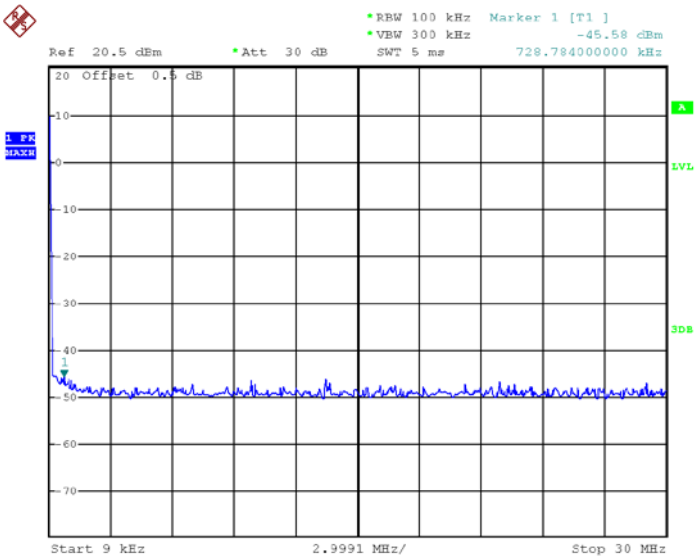


802.11g

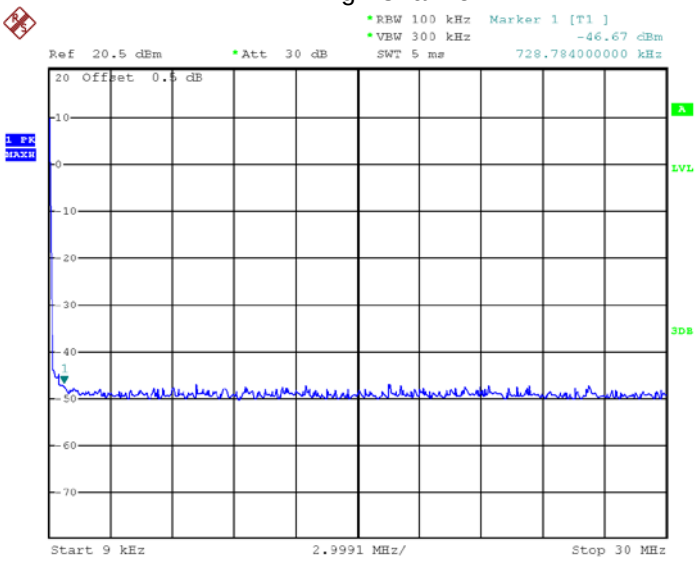
Low Channel



Middle Channel

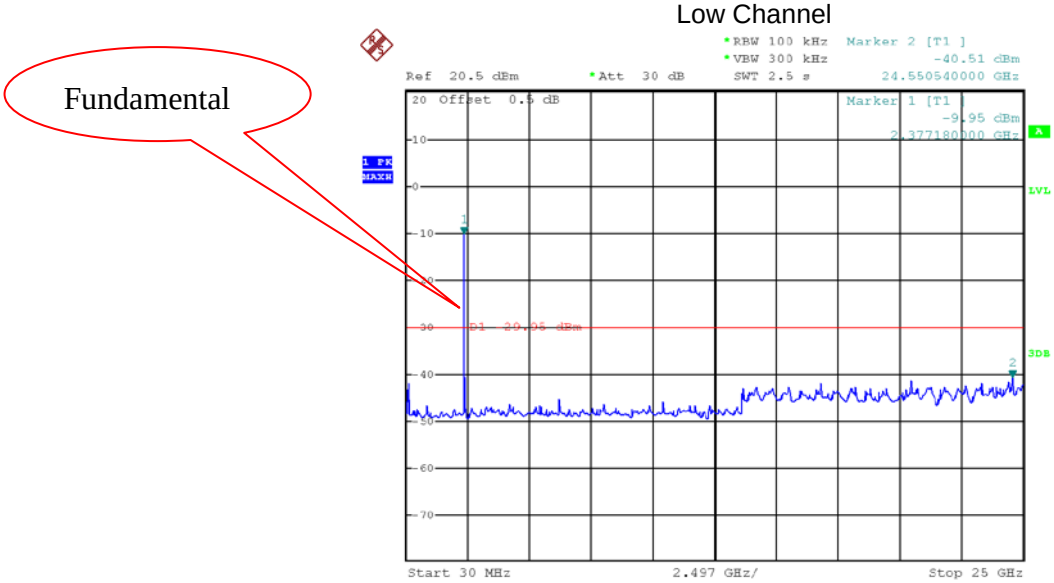


High Channel

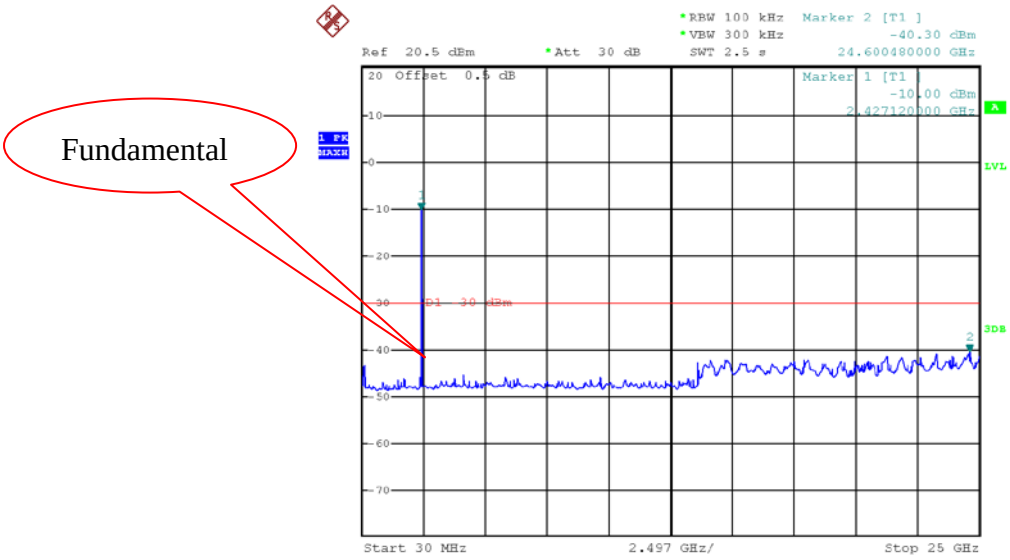


802.11g

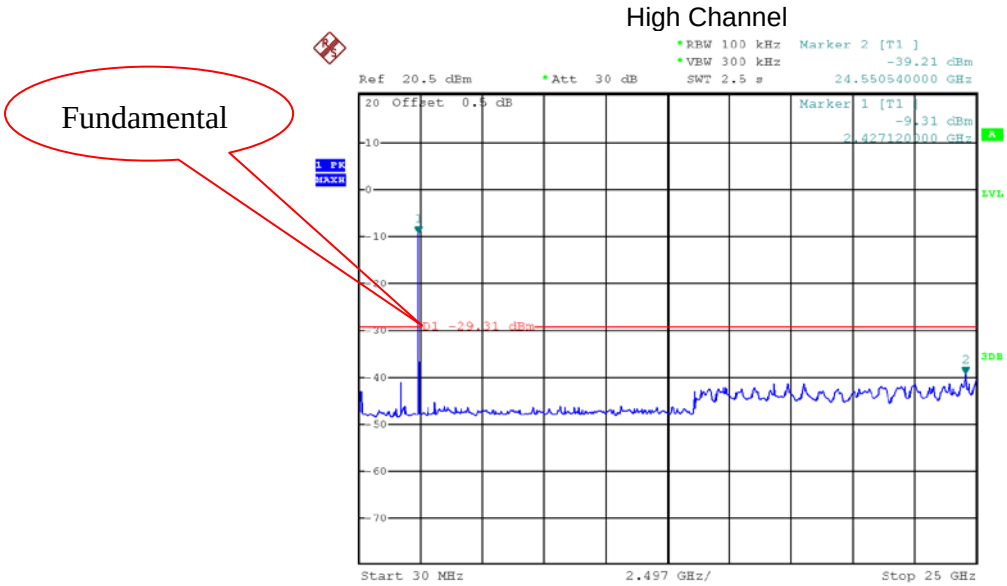
Low Channel



Middle Channel

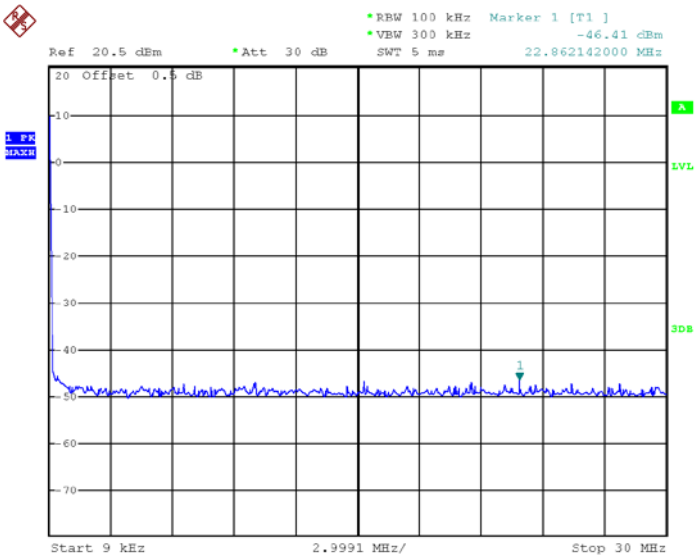


High Channel

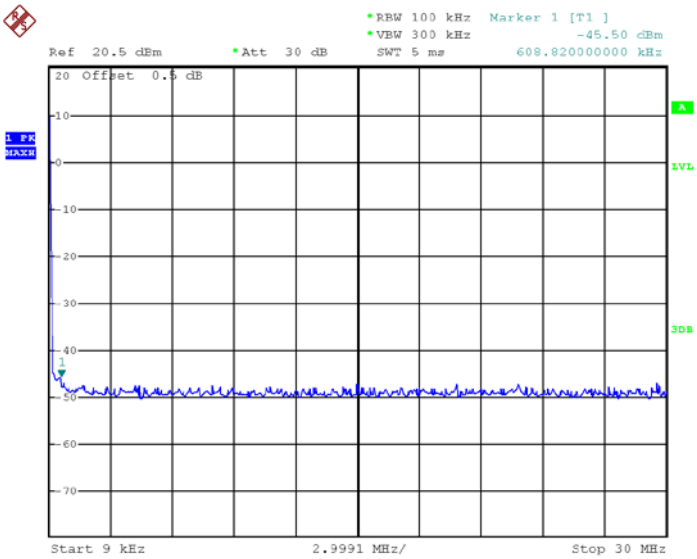


802.11n HT20

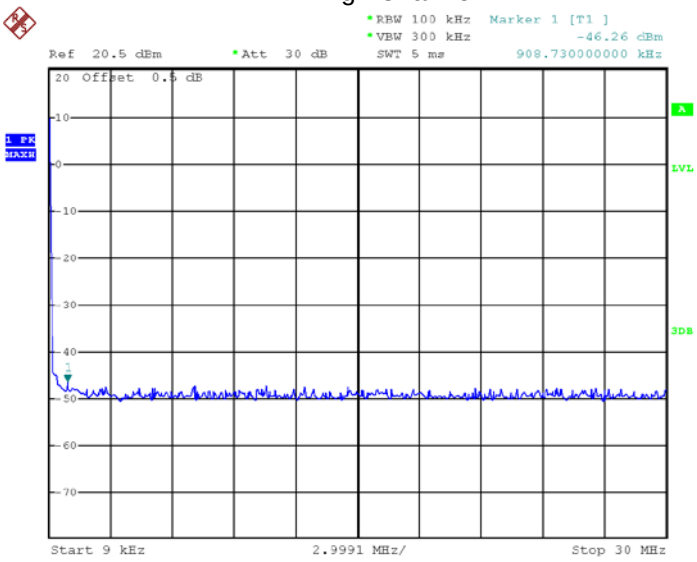
Low Channel



Middle Channel

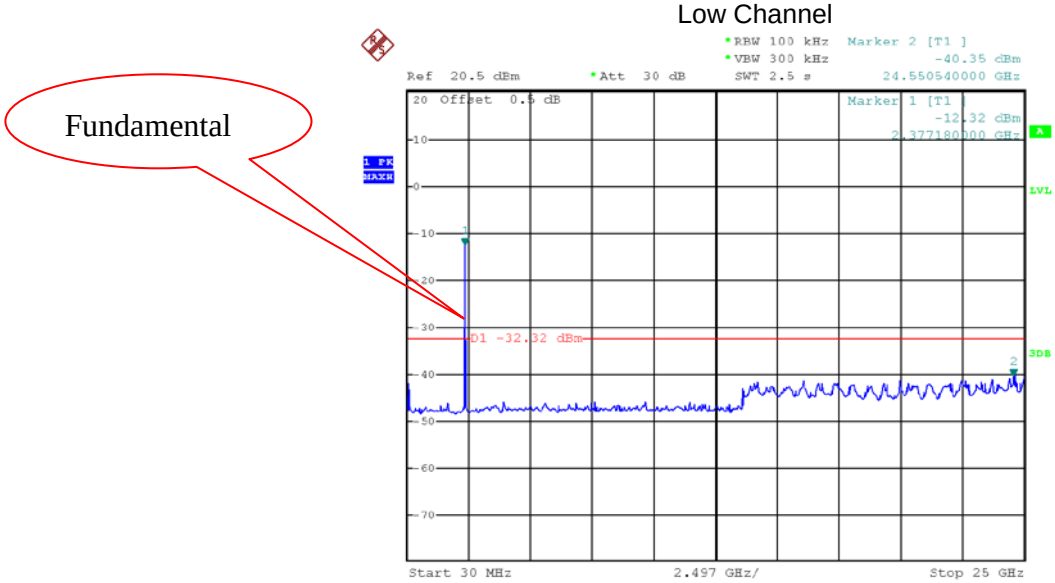


High Channel

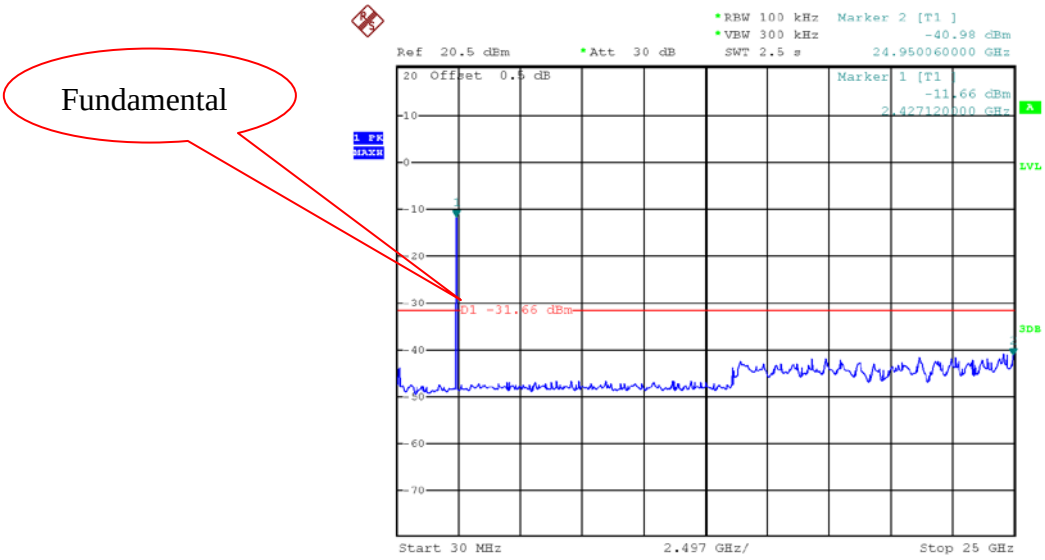


802.11n HT20

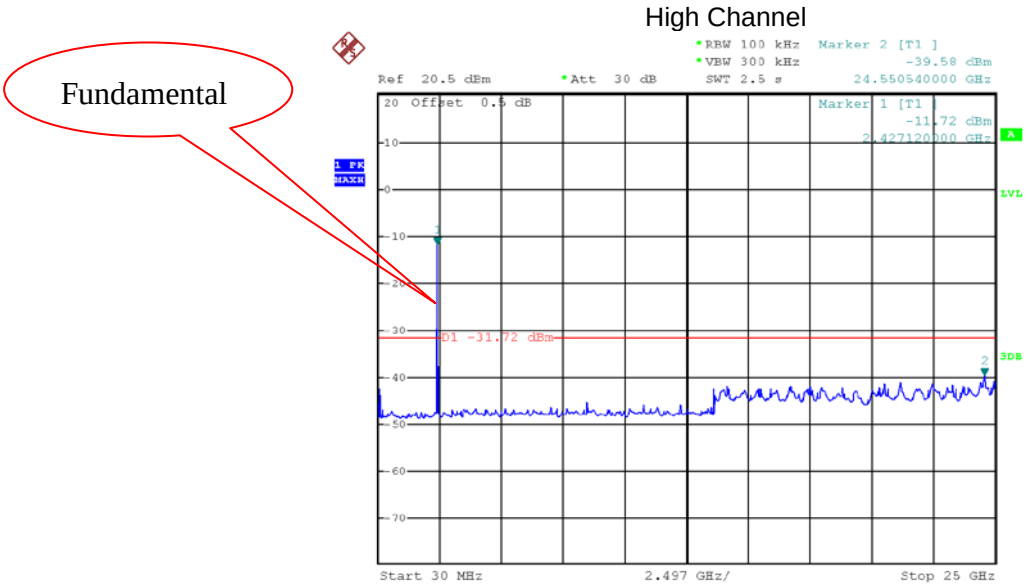
Low Channel



Middle Channel

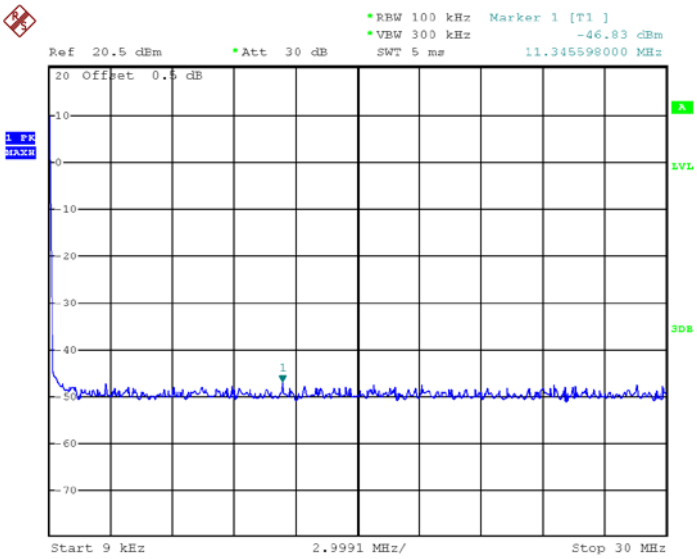


High Channel

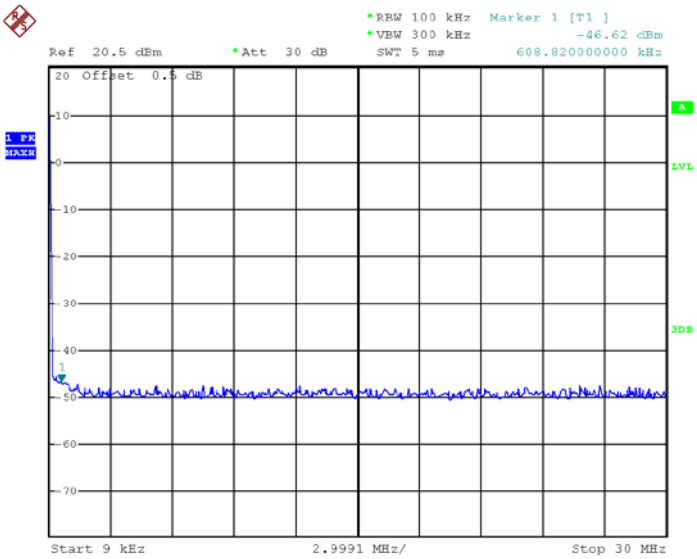


802.11n HT40

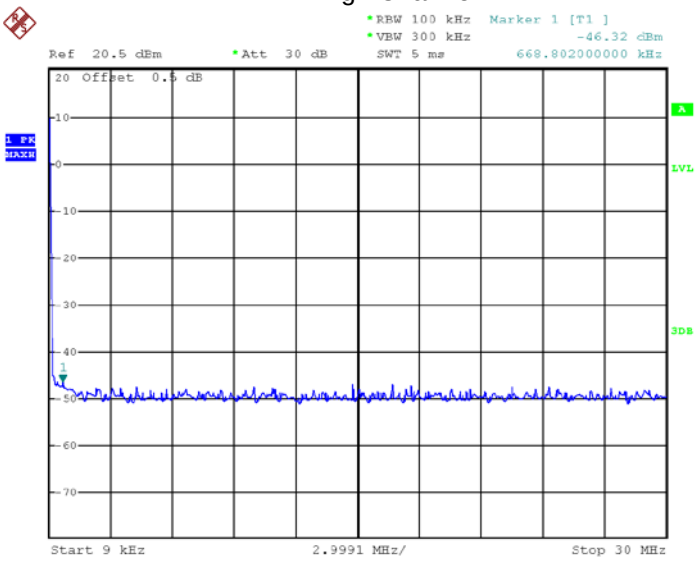
Low Channel



Middle Channel

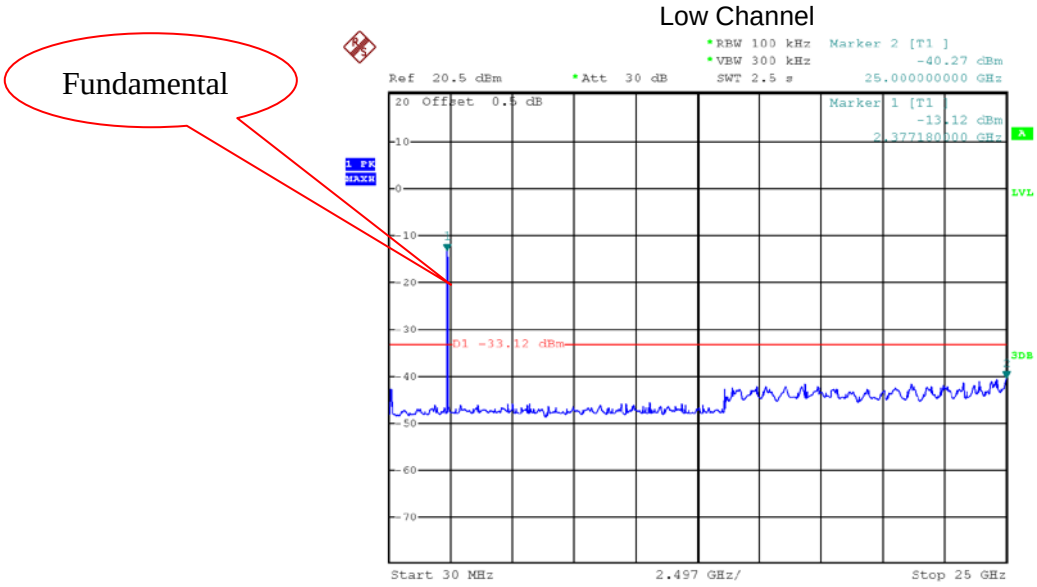


High Channel

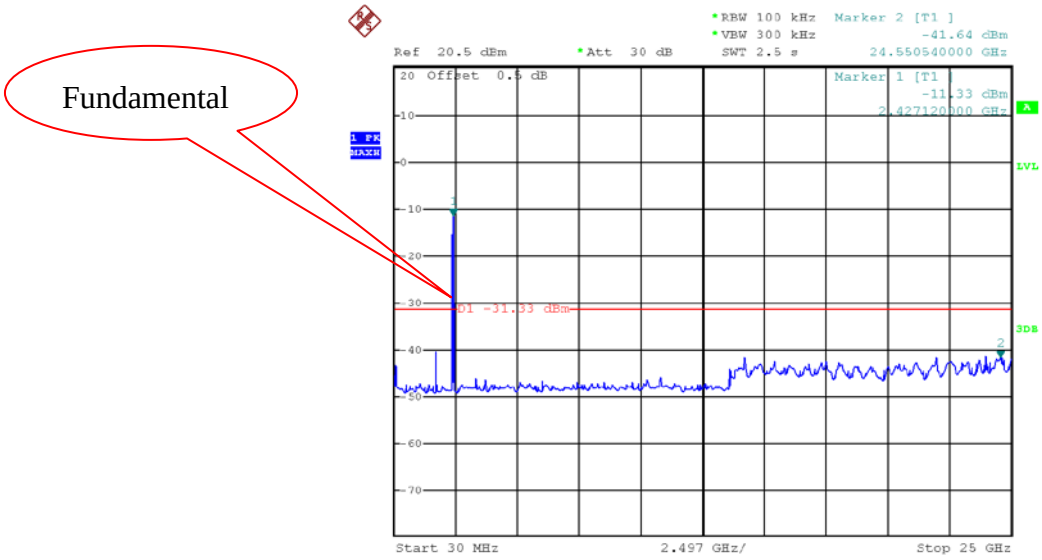


802.11n HT40

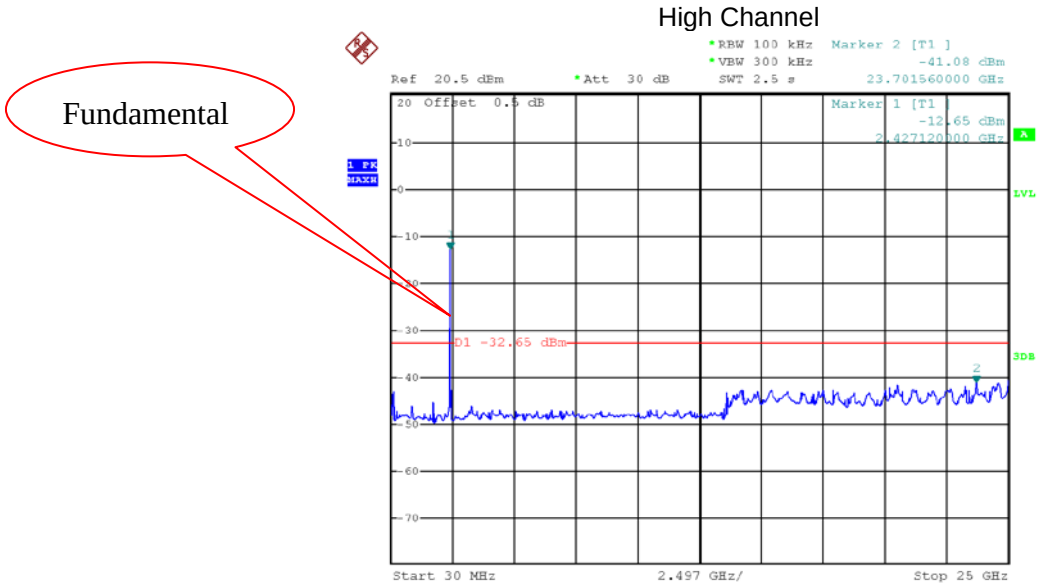
Low Channel



Middle Channel



High Channel



8 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	558074 D01 15.247 Meas Guidance v05r02
Test Limit:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
Test Mode:	Transmitting

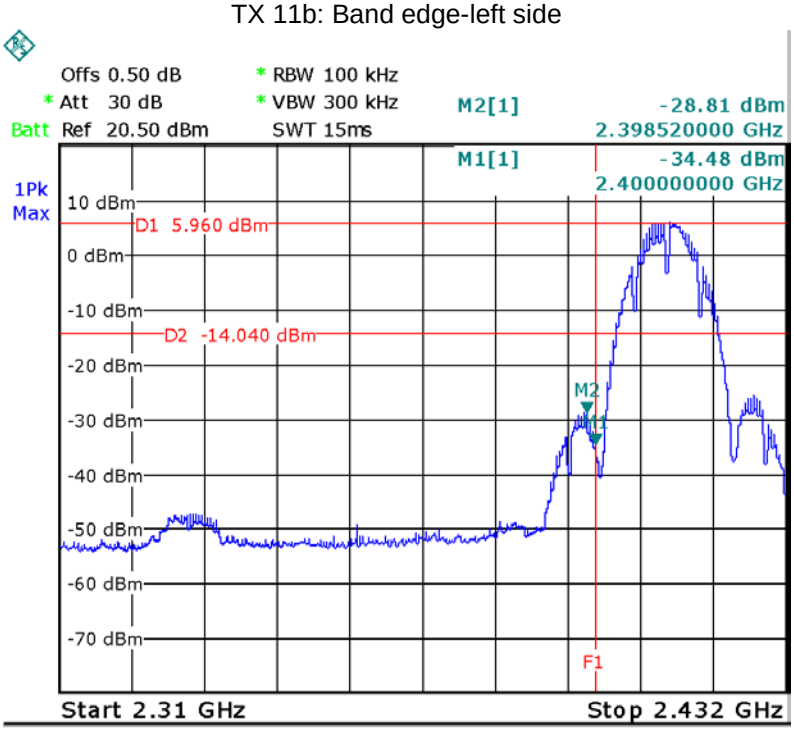
8.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

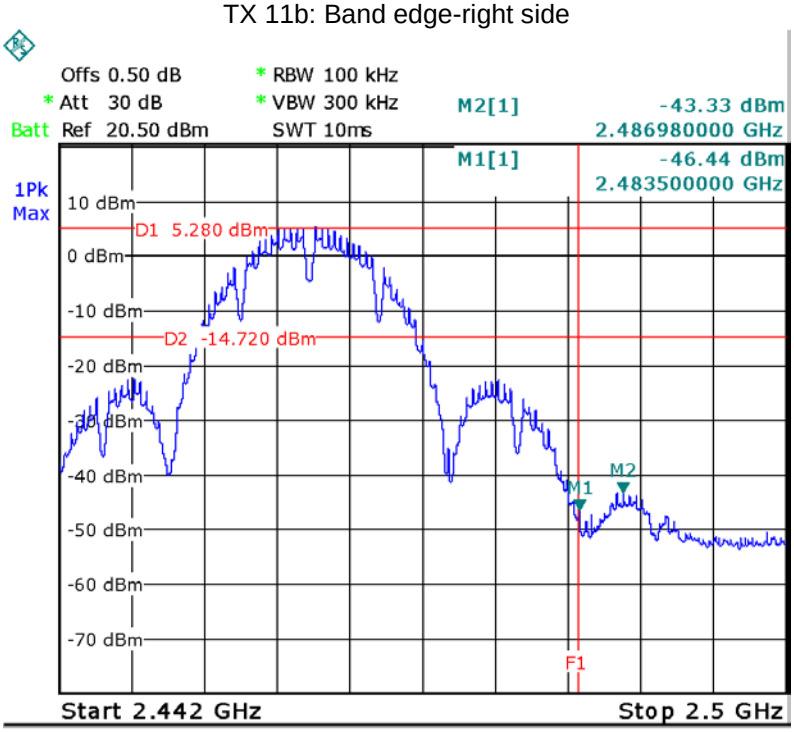
8.2 Test Result

Test result plots shown as follows:

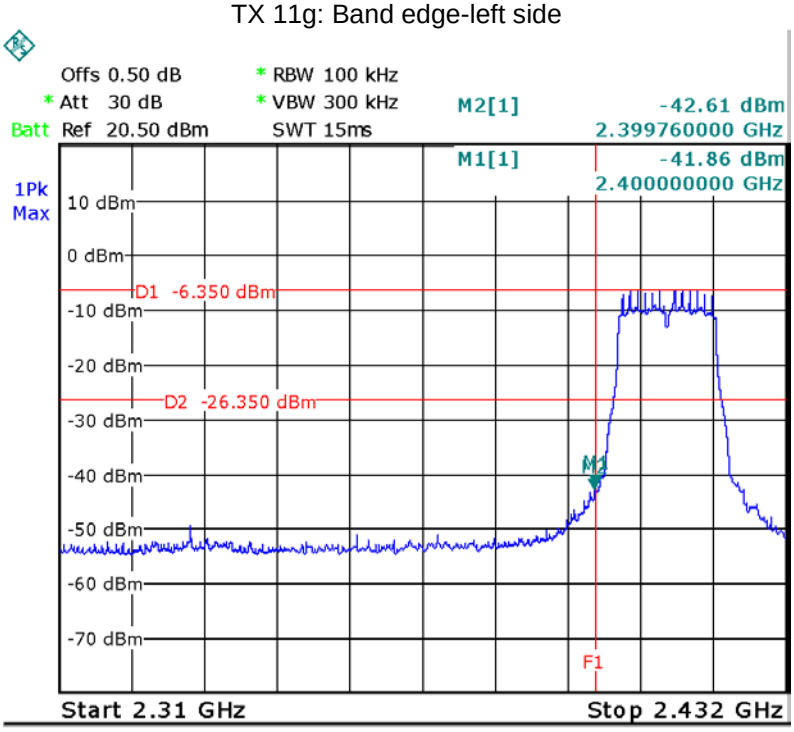
TX 11b: Band edge-left side



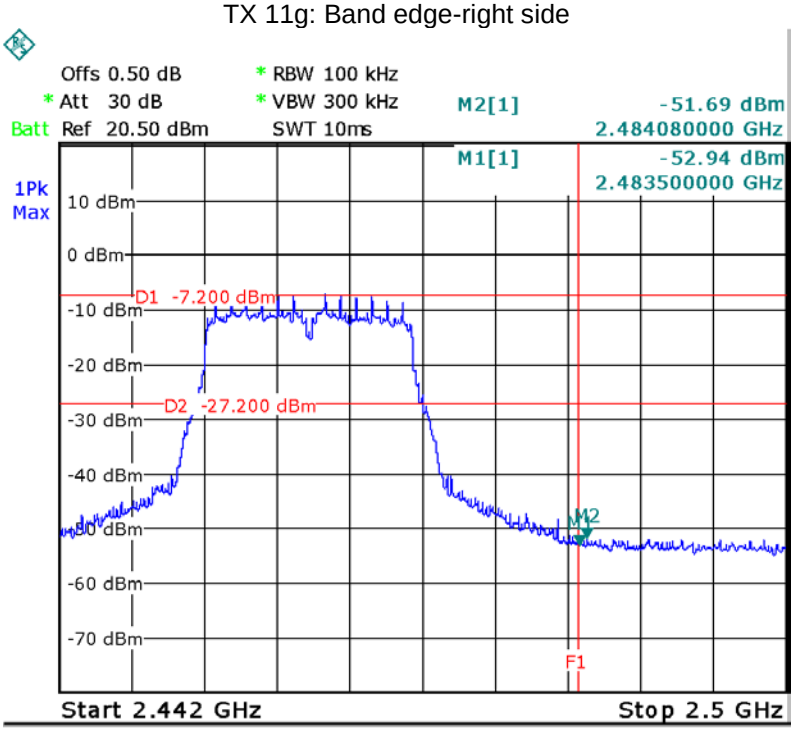
TX 11b: Band edge-right side



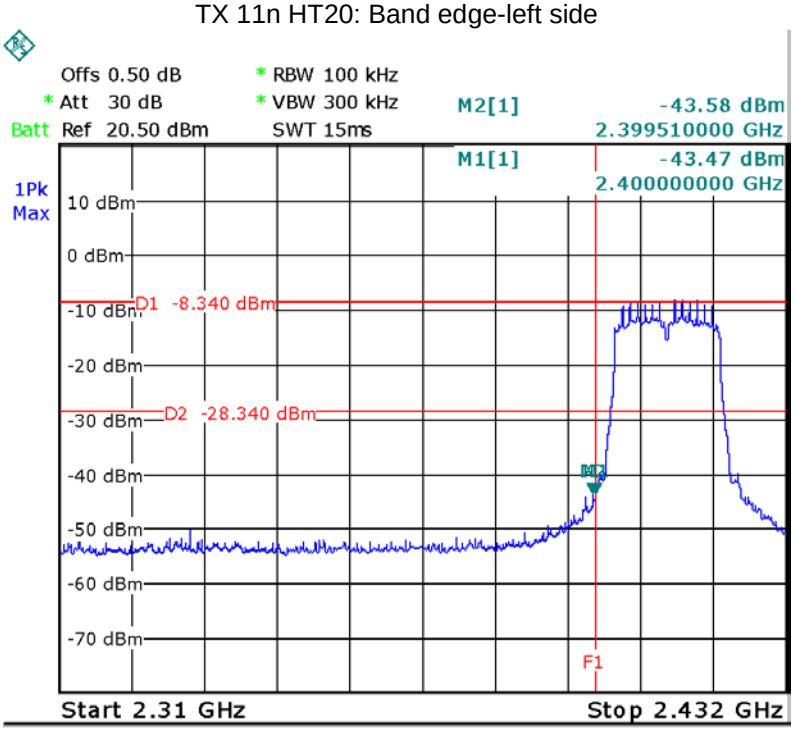
TX 11g: Band edge-left side



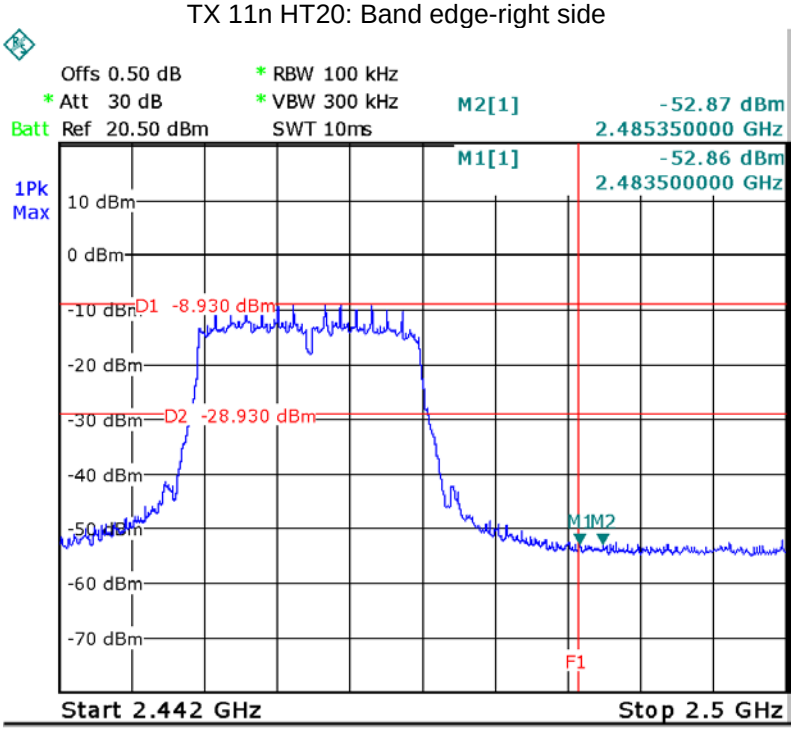
TX 11g: Band edge-right side



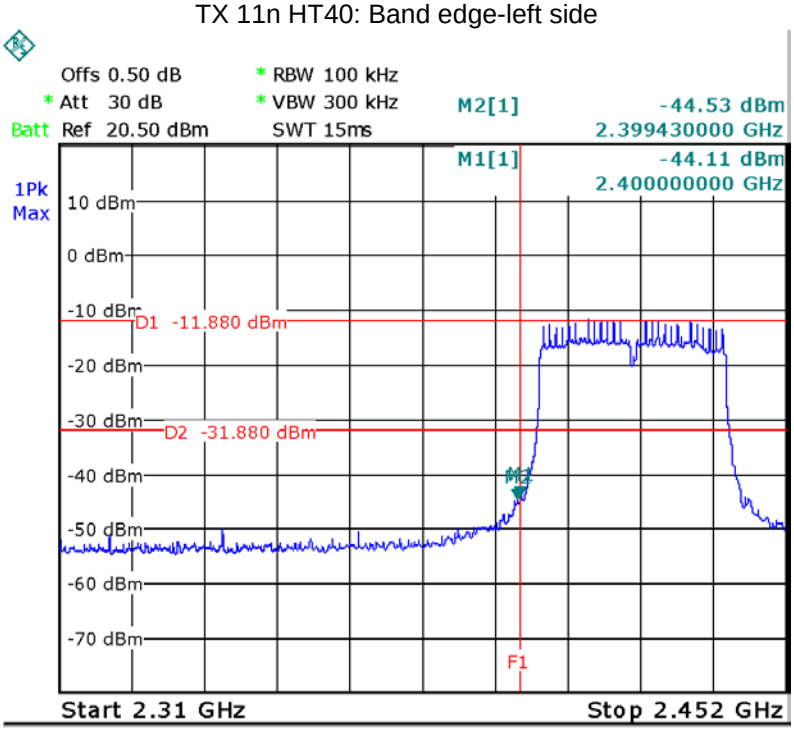
TX 11n HT20: Band edge-left side



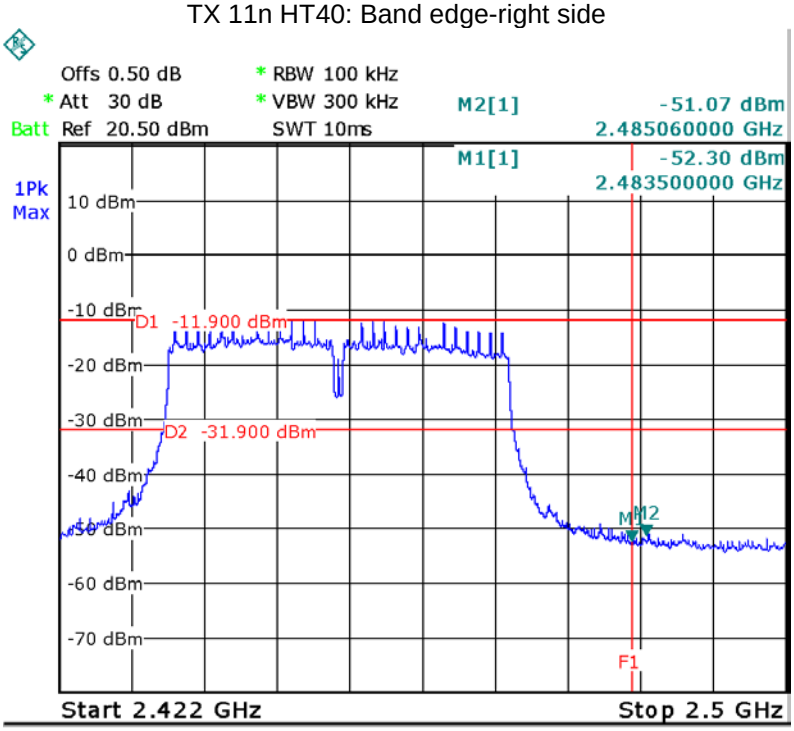
TX 11n HT20: Band edge-right side



TX 11n HT40: Band edge-left side



TX 11n HT40: Band edge-right side



9 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02

9.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

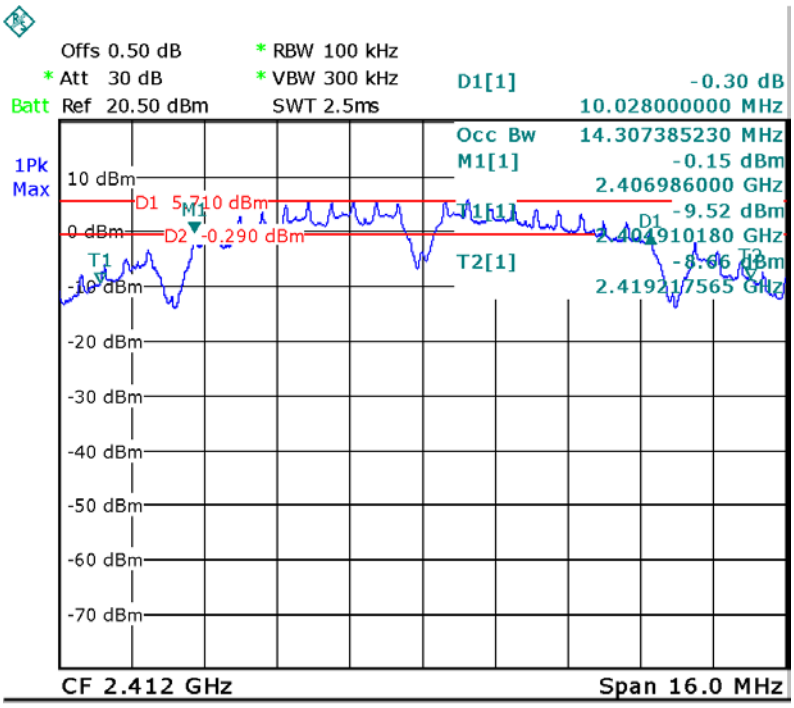
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

9.2 Test Result:

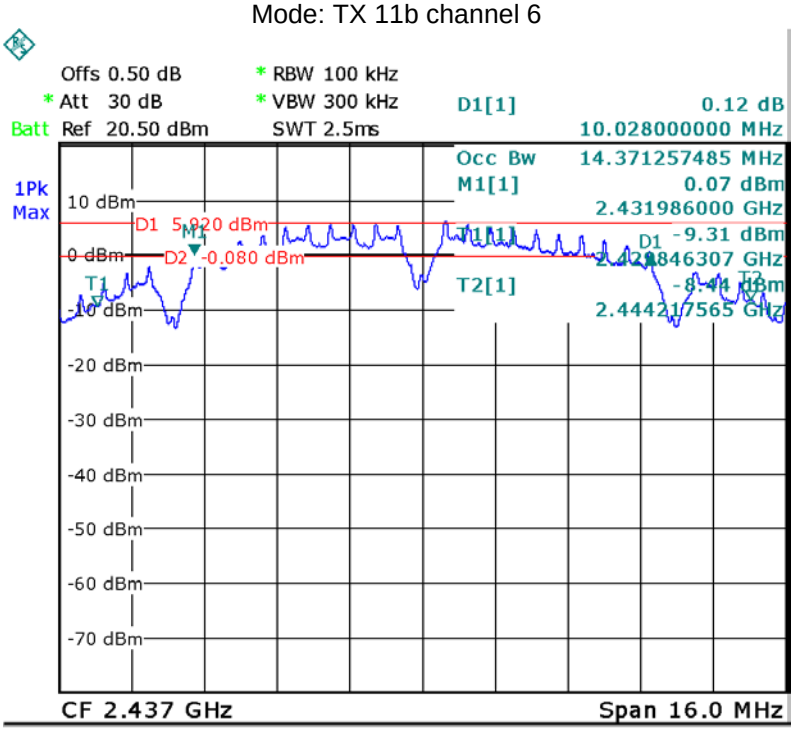
WiFi:

Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	10.028	10.028	10.092	14.307	14.371	14.530
TX 11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.367	16.367	16.367	16.467	16.517	16.467
TX 11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.569	17.515	17.515	17.569	17.623	17.623
TX 11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	36.230	36.010	36.010	36.008	36.118	36.118

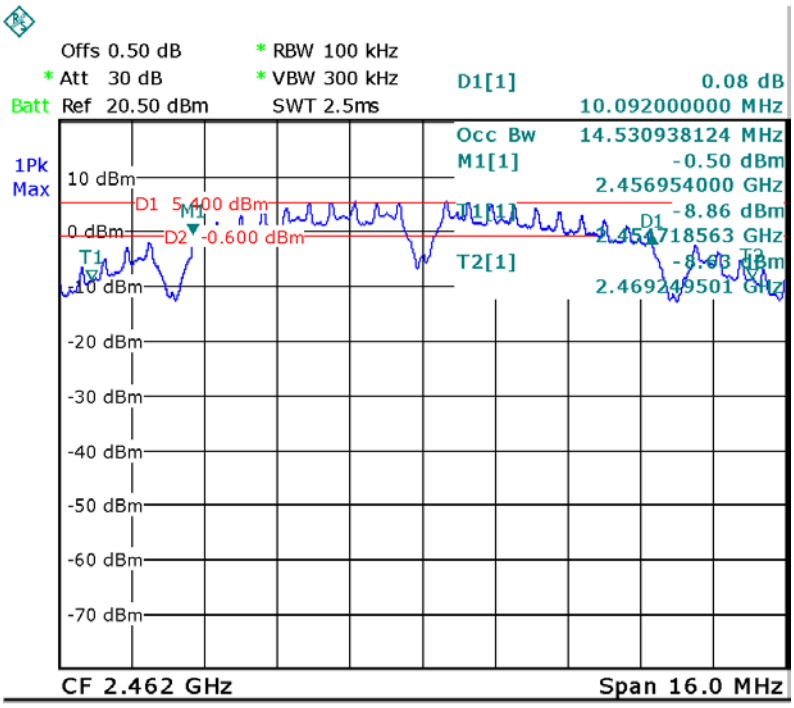
Mode: TX 11b channel 1



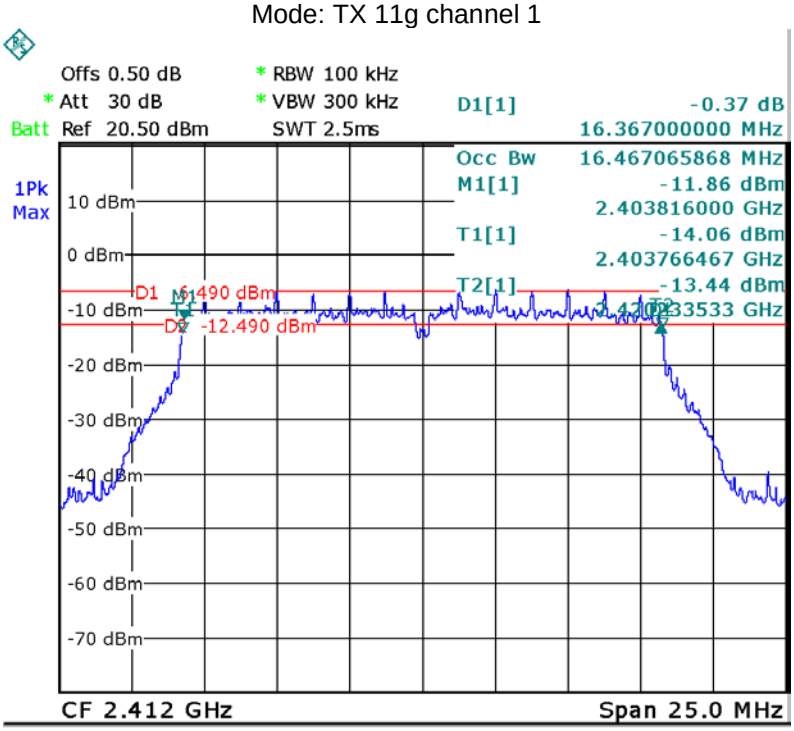
Mode: TX 11b channel 6



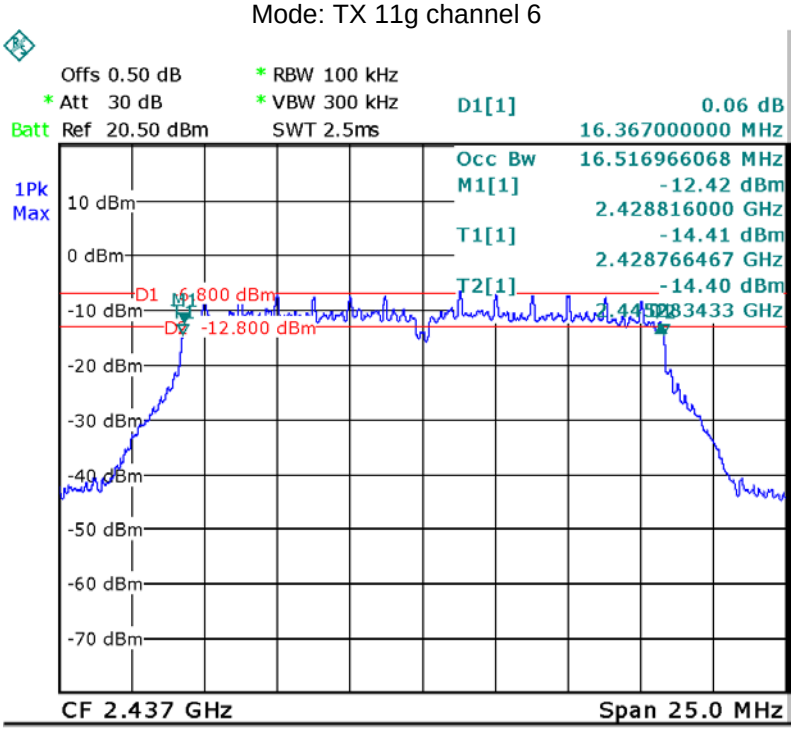
Mode: TX 11b channel 11



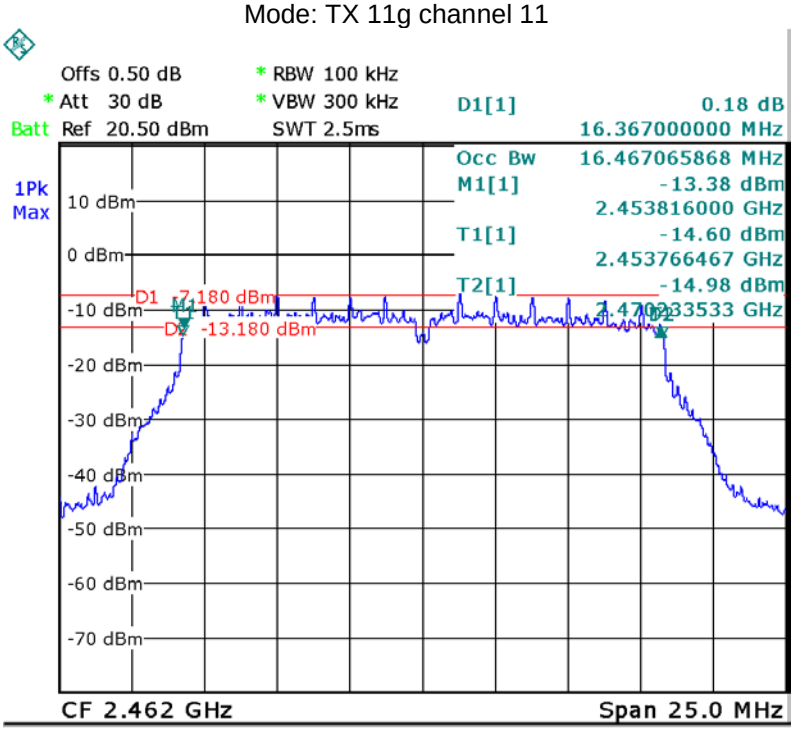
Mode: TX 11g channel 1



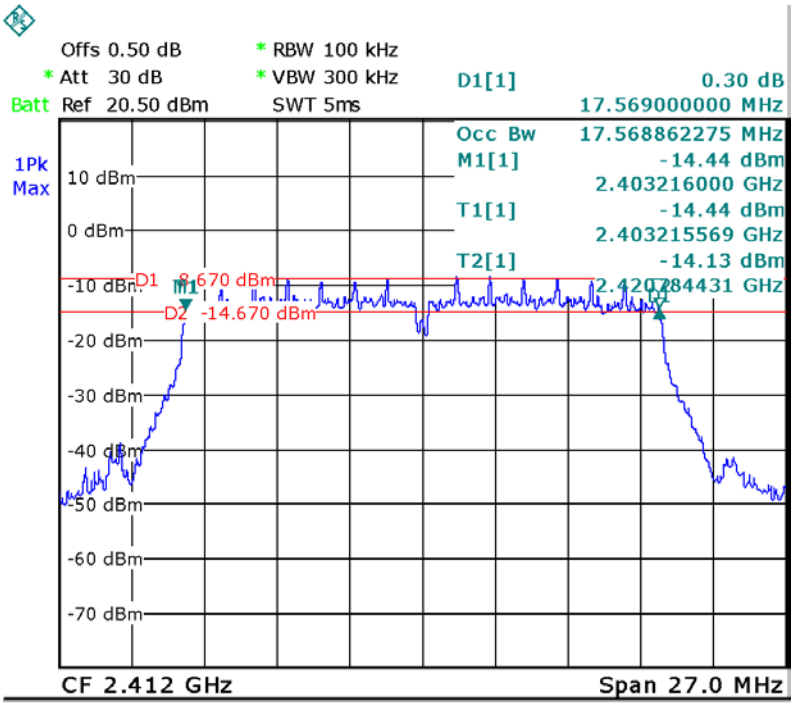
Mode: TX 11g channel 6



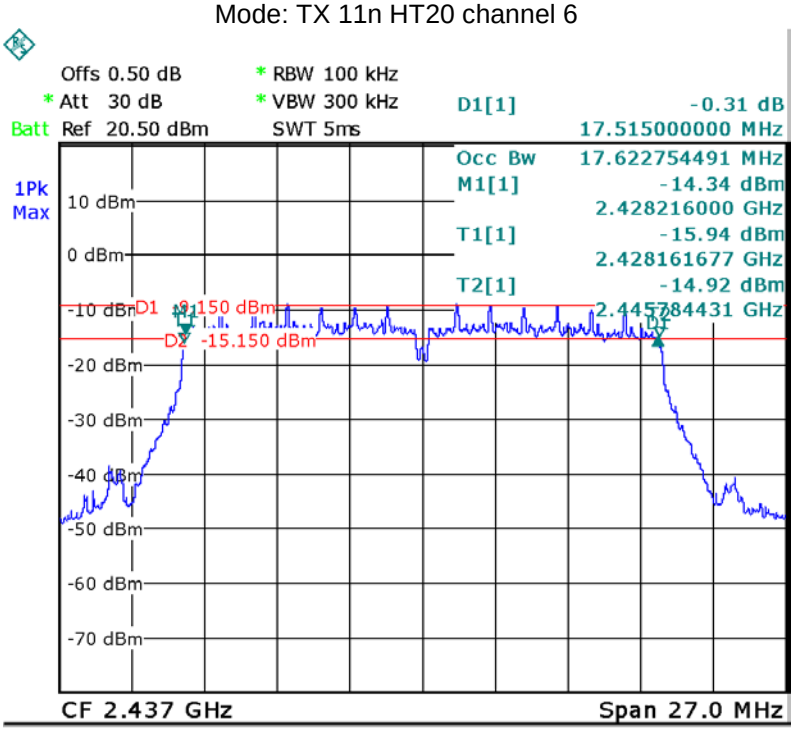
Mode: TX 11g channel 11



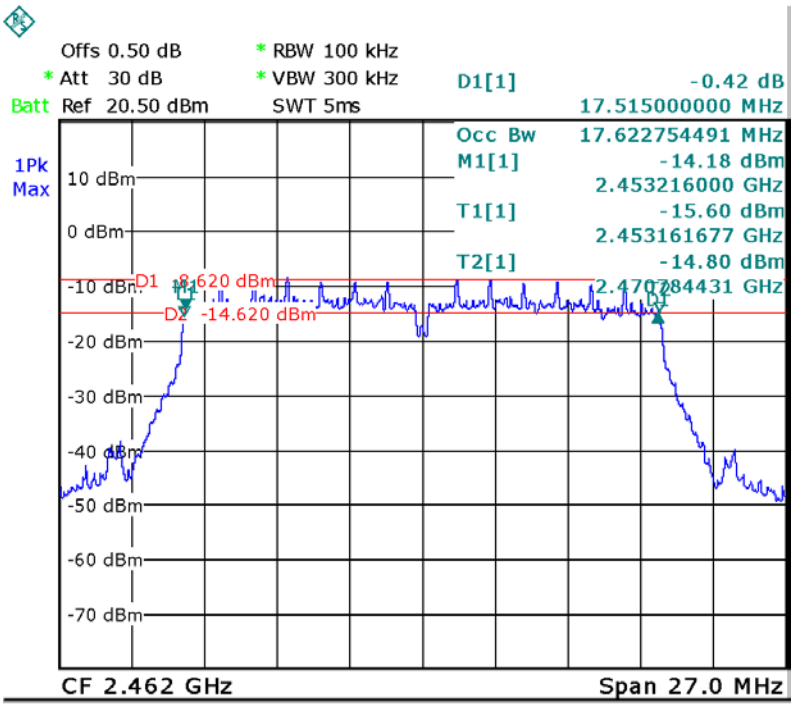
Mode: TX 11n HT20 channel 1



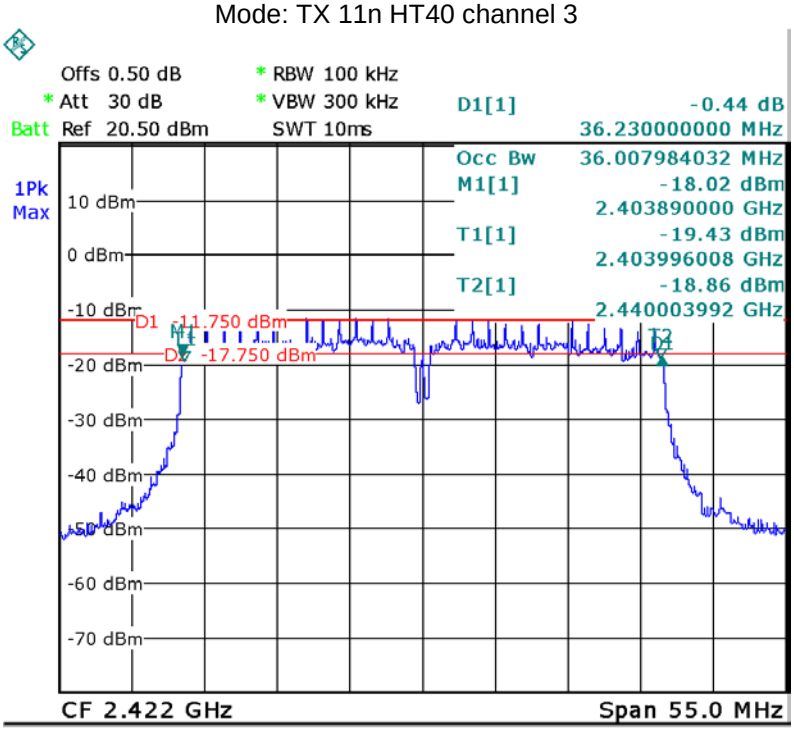
Mode: TX 11n HT20 channel 6



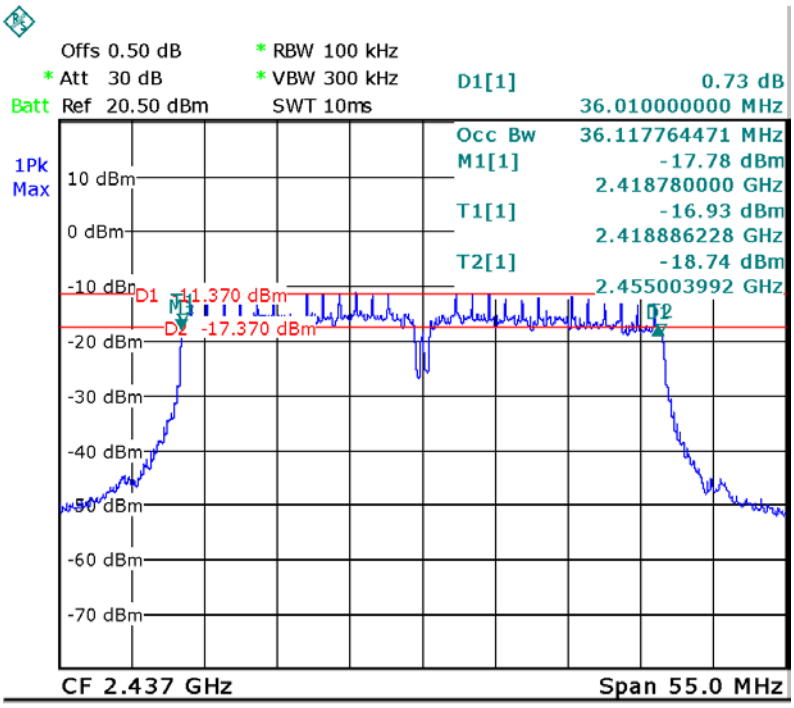
Mode: TX 11n HT20 channel 11



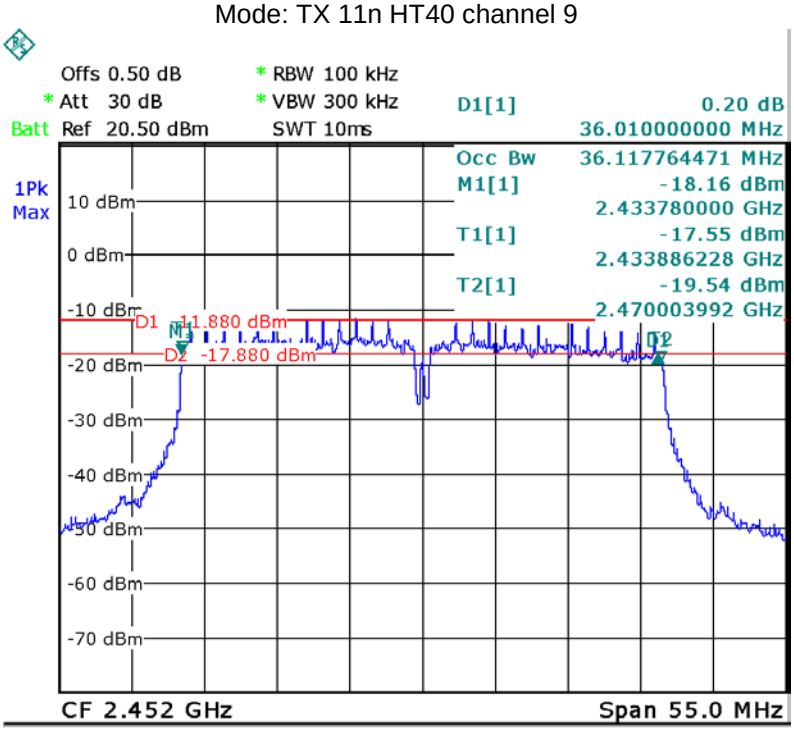
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



10 Maximum Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02

10.1 Test Procedure:

558074 D01 15.247 Meas Guidance v05r02

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function =Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

10.2 Test Result:

WiFi

Test mode :TX 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
17.56	17.10	17.08
Limit: 1W/30dBm		
Test mode :TX 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
12.78	12.13	12.41
Limit: 1W/30dBm		
Test mode :TX 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
10.34	10.83	10.74
Limit: 1W/30dBm		
Test mode :TX 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
10.13	10.54	9.73
Limit: 1W/30dBm		

11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 15.247 Meas Guidance v05r02

11.1 Test Procedure:

558074 D01 15.247 Meas Guidance v05r02

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

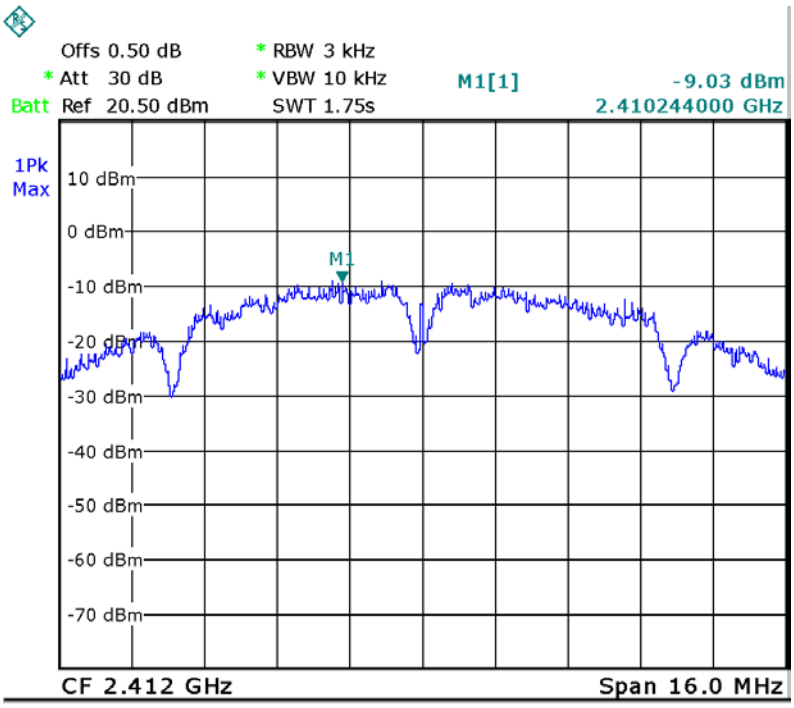
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

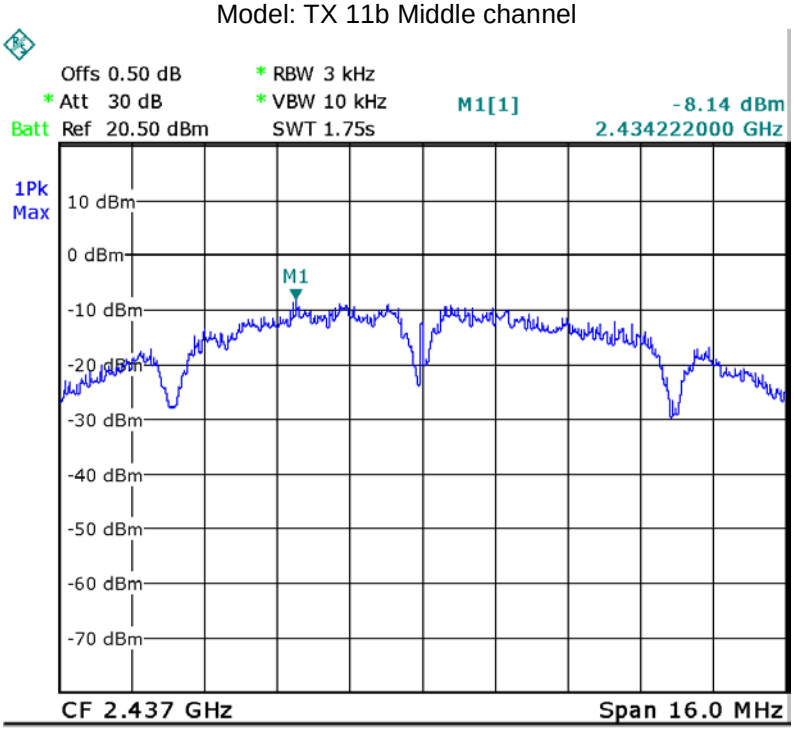
11.2 Test Result:

Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-9.03	-8.14	-7.61
Limit: 8dBm per 3kHz		
Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-18.32	-18.08	-17.82
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-19.19	-19.91	-21.58
Limit: 8dBm per 3kHz		
Test mode :TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-20.88	-19.82	-20.33
Limit: 8dBm per 3kHz		

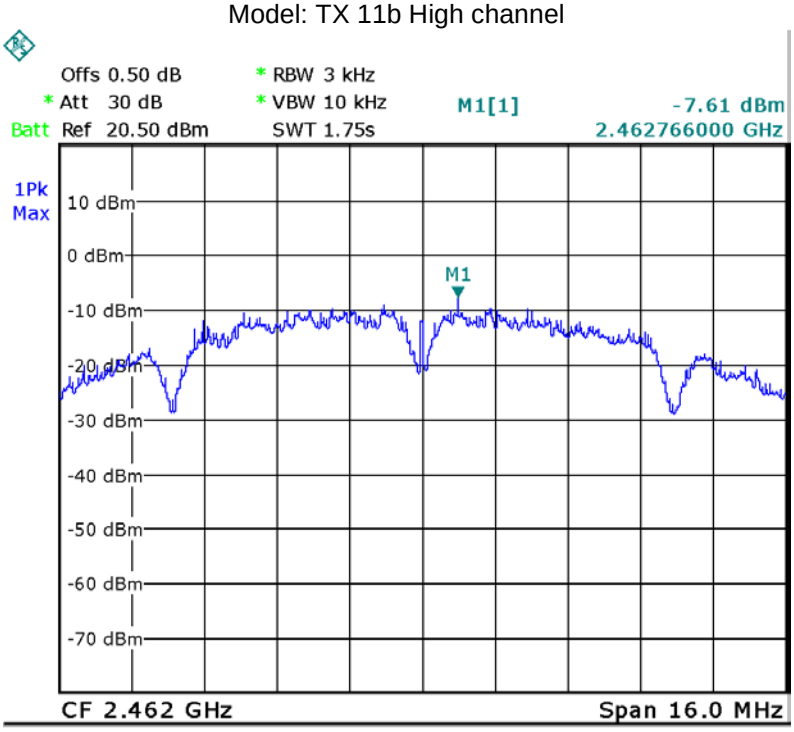
Model: TX 11b Low Channel



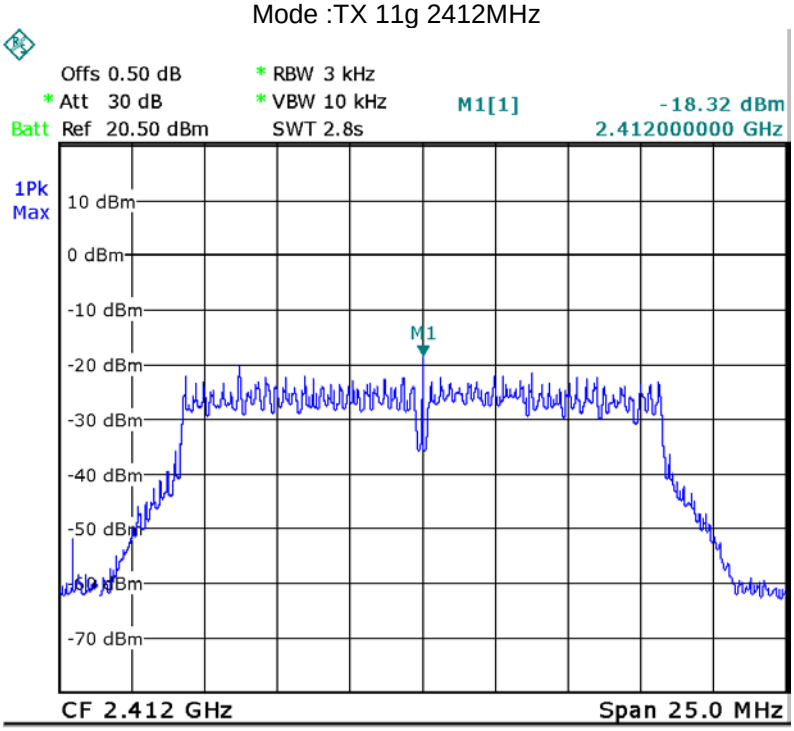
Model: TX 11b Middle channel



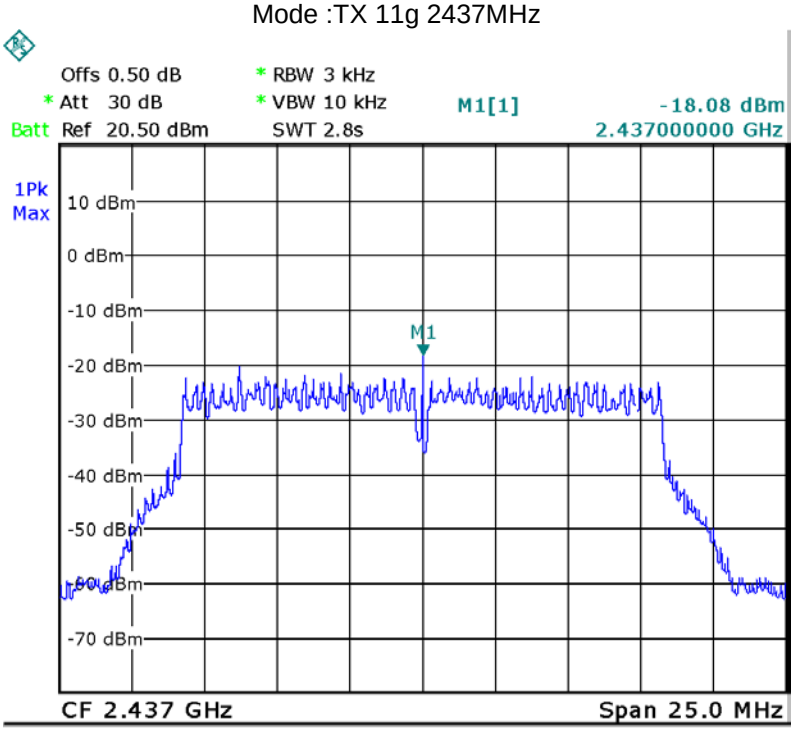
Model: TX 11b High channel



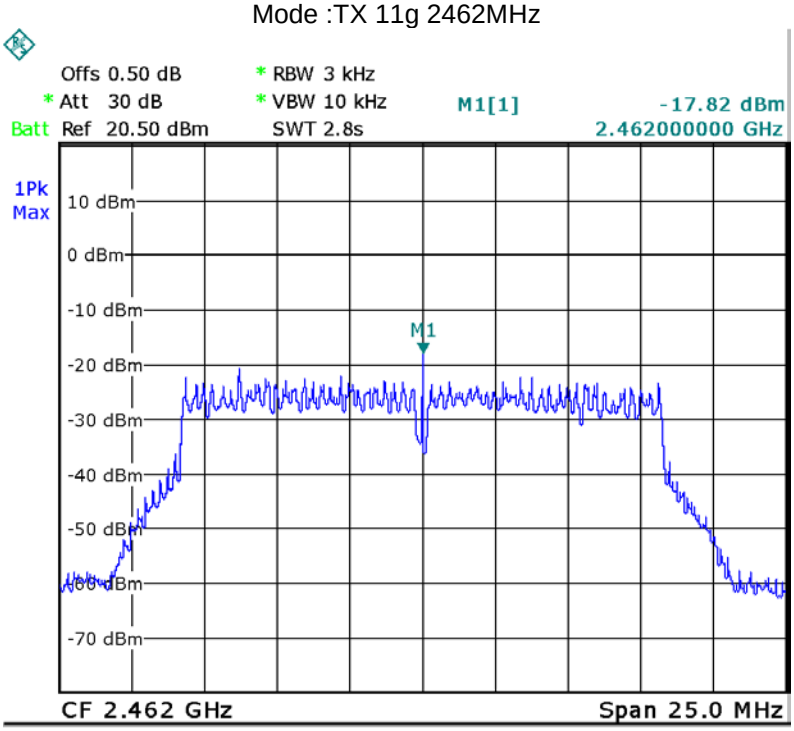
Mode :TX 11g 2412MHz



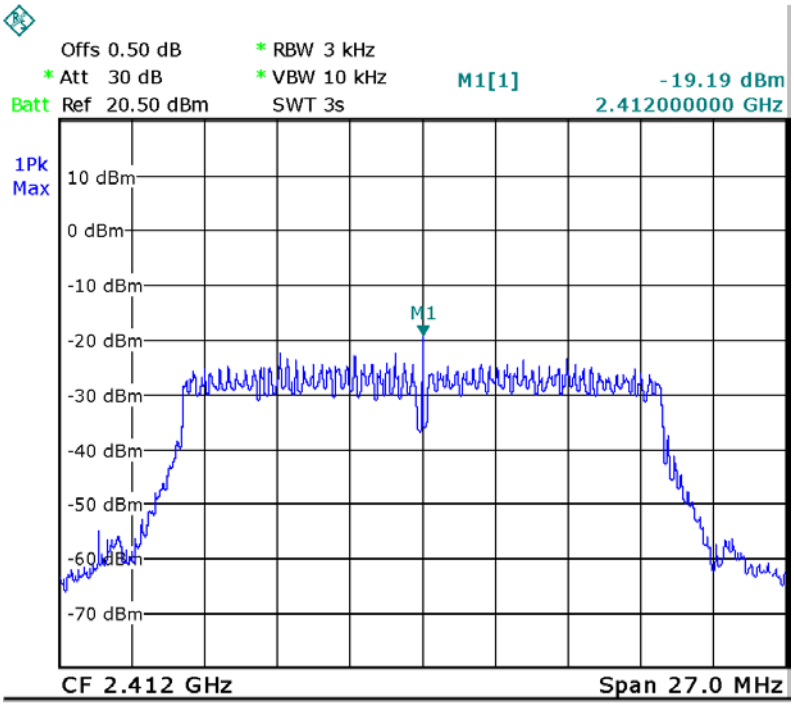
Mode :TX 11g 2437MHz



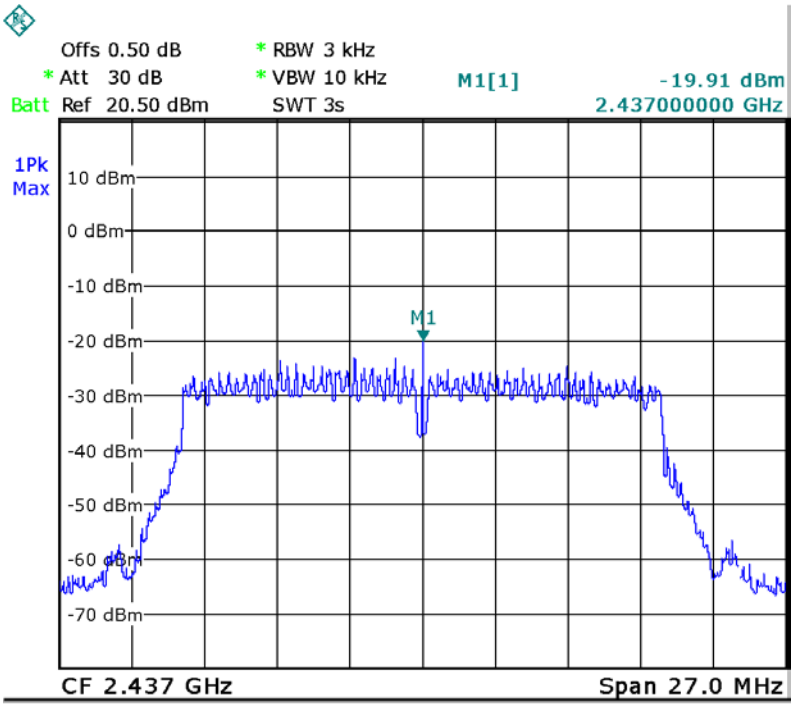
Mode :TX 11g 2462MHz



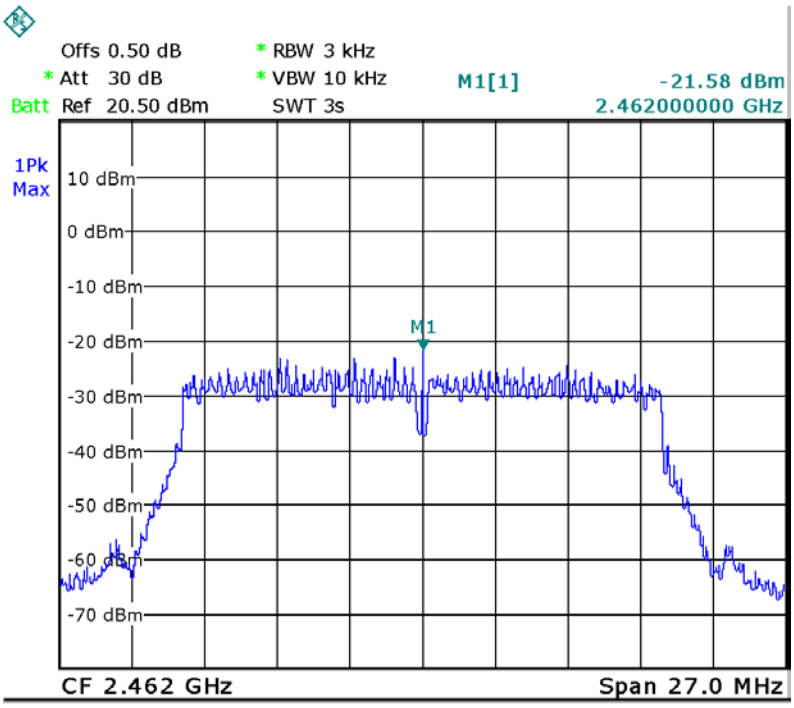
Mode: TX 11n HT20 2412MHz



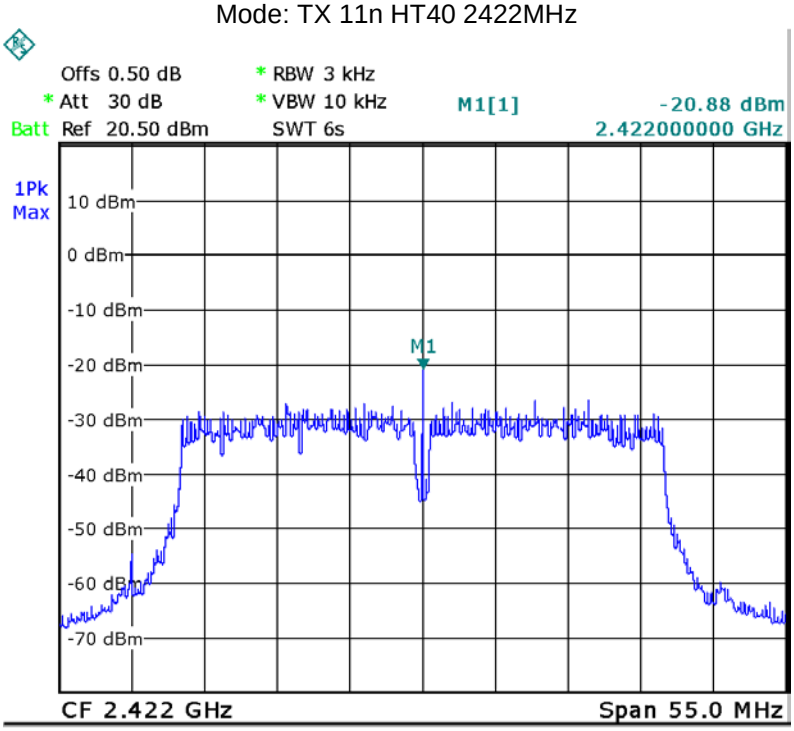
Mode: TX 11n HT20 2437MHz



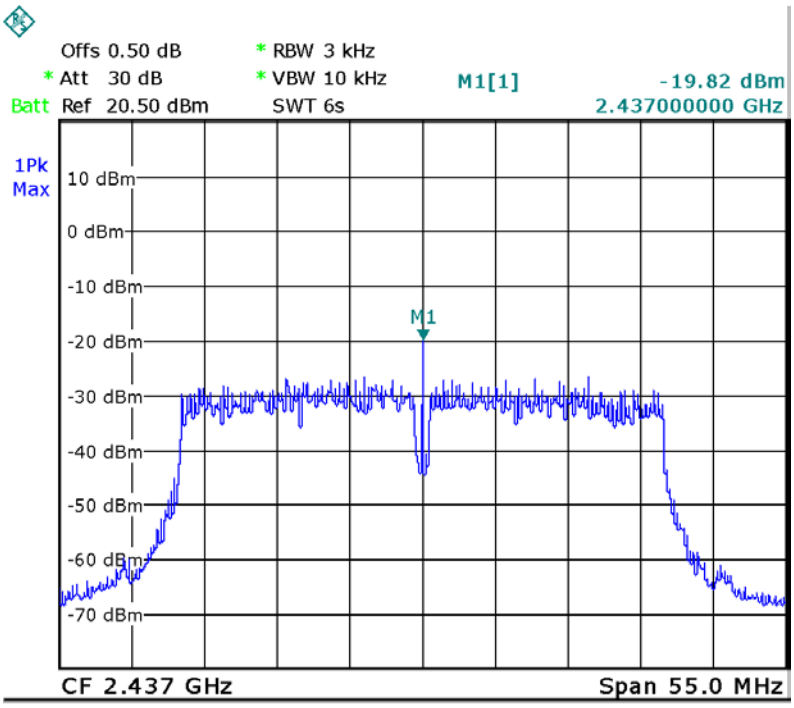
Mode: TX 11n HT20 2462MHz



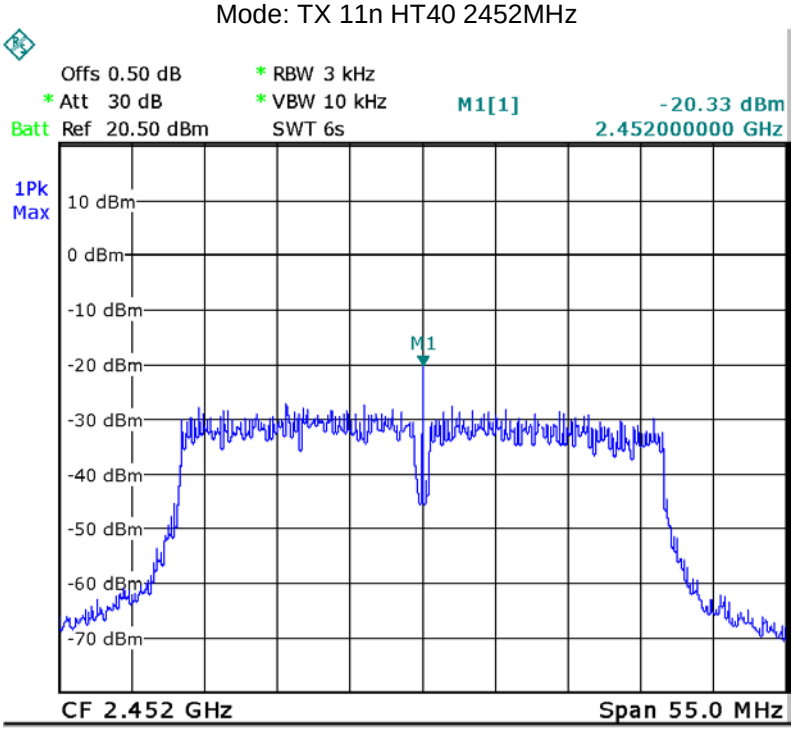
Mode: TX 11n HT40 2422MHz



Mode: TX 11n HT40 2437MHz



Mode: TX 11n HT40 2452MHz



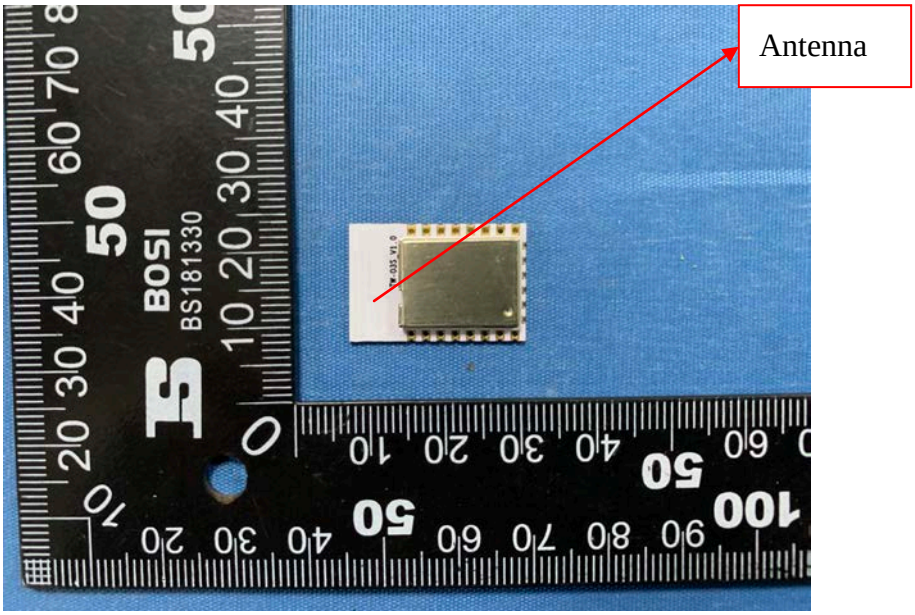
12 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Result:

The EUT have one PCB Printed Antenna, meets the requirements of FCC 15.203.



13 FCC ID:2AUPR-XJ-W1A RF Exposure Report

Note: Please refer to RF Exposure Report: WTN19S09066646W002.

14 Photographs - Model XJ-W1A Test Setup Photos

Note: Refer to the file XJ-W1A_Test Setup Photos.

15 Photographs - Constructional Details

15.1 Model XJ-W1A-External Photos

Note: Refer to the file XJ-W1A_External Photos.

15.2 Model XJ-W1A-Internal Photos

Note: Refer to the file XJ-W1A_Internal Photos.

======End of Report======